

AN

HISTORICAL REPORT



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RAMSGATE HARBOUR:

WRITTEN BY ORDER OF, AND ADDRESSED TO

THE TRUSTEES.



By JOHN SMEATON, K

CIVIL ENGINEER, F.R.S. AND ENGINEER TO
RAMSGATE HARBOUR.

THE SECOND EDITION.

L O N D O N:

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TO THE TRUSTEES
HISTORICAL REPORT



RAMSCATE HARBOUR

OF THE TRUSTEES OF THE RAMSCATE HARBOUR



C O N T E N T S.

S E C T I O N I.

ACCOUNT of early Attempts, towards making an Harbour for the Downs; and of Proceedings, till an Act of Parliament had been obtained, for establishing such an Harbour at Ramsgate - - - Page 1

S E C T I O N II.

Proceedings of the Trustees, from the Commencement of the Work in 1749, to the total Stoppage of the same in 1755, upon Petition to the House of Commons - 10

S E C T I O N III.

Occurrences from the Stopping of the Works in 1755, to their Re-commencement in 1761 - - - - - 25

S E C T I O N IV.

Transactions of the Trustees, from the Re-commencement of the Work in 1761, to the End of the Year 1773; when the Committee pressed the Board to consider of more effectual Means of cleansing the Harbour - 29

S E C T I O N

C O N T E N T S.

S E C T I O N V.

Proceedings of the *Trustees*, from the Beginning of the
Year 1774, to the Delivery of Mr. SMEATON's *Report*;
and Transactions upon it, to the End of the Year
1778 - - - - - - - - Page 33

S E C T I O N VI.

The First Starting, and *Effects* of the *Sluices* in 1779;
with the Account of their Operation, to the End of
the Year 1781 - - - - - - - - 43

S E C T I O N VII.

Transactions from the Proposal of a *Dock* in 1782, to and
inclusive of Mr. SMEATON's Third Visit to *Ramsgate* in
the Summer of 1787; with the Transactions to the
Death of JOHN BARKER, *Esquire*, in the Autumn of
that Year - - - - - - - - 50

S E C T I O N VIII.

The Choice of ALEXANDER AUBERT, *Esquire*, to be
Chairman, in Autumn 1787; and the subsequent
Transactions down to the present Time - - 65

The present State of *Ramsgate Harbour* - - 82

Conclusive *Addenda* - - - - - 86

S E C T I O N

TO THE TRUSTEES
OF
RAMSGATE HARBOUR.

MY LORDS AND GENTLEMEN,

THE following Piece was begun last year by your order, principally with a view to inform the Public of the improved State of *Ramsgate Harbour*, and of the further improvements that were in a way to be brought about; as also of the unexpected *difficulties* that had occurred in the progress and actual execution of this long-desired establishment.—Indeed the small length of time that it has been an Harbour capable of *fulfilling* the purposes for which it was begun, has scarcely given opportunity to the *Maritime* Part of this Nation, and more especially to *Foreigners*, to acquaint themselves with the advantages they may derive from the use thereof.

It is now somewhat more than *ten years* since *Ramsgate Harbour* was so far cleansed of Sand and Silt, as to be capable of taking in Ships of superior draught of water and tonnage, to what appears to have been the object of Parliament in granting the Act, as well as to the views of the original promoters of the undertaking; yet it was not till the winter before the present (January 1790) that the real practical utility of this Harbour appeared in full view; for, it had so happened, that the same means that had been necessarily employed for

cleansing it (that is to say, for constituting it an Harbour) had subjected it to that degree of agitation and inquietude, as in general rendered it more eligible to Vessels of *Burden*, (such as might very well have come in, as to draught of water,) to submit to the wear and tear of their tackle, and the risque of *riding it out* in the *Downs*, than come into the Harbour till they had received some *actual damage*.

The *quiet* of the Harbour has at length in great measure been happily effected, along with the other advantages, by the progress made in the construction of an *advanced Pier*. This was only begun in the summer of 1788, and at Christmas 1789 was run out the length of 120 feet; that is nearly one third of its proposed length, which so sensibly quieted the Harbour, that in *January*, and part of *February* 1790, there were in it no less than 160 Ships and Vessels *at one time*, that came thither for refuge in distress, and to save the wear and tear of their tackle and furniture, all of which must otherwise have crowded the *Downs*.—Almost an equal number, for the same reason, came into the Harbour, and were in it at one time, during the tempestuous weather of last *January*, amongst which were *four West India-men*, from 350 to 500 Tons.

It may however possibly seem to some, that the means now taking to *quiet the Harbour*, may have the effect of rendering it less *accessible*; but this, when properly understood, will not appear to be the

the case, but so far otherwise, that in reality a Ship will come in with *greater facility*: for the Harbour's Mouth is *in effect*, considering the Angle of Entrance, as wide as it was before the *advanced Pier* was begun.—The original *intended* width of the Harbour's Mouth was 200 feet: the *opening* to be at S.S.W. The width ultimately fixed upon by the Trustees, was 300 feet at S. $\frac{1}{2}$ E.: but that width and position appears to have been settled at a time, when the Trustees were apprehensive of the Harbour's *entirely choaking up with Silt*, if more *inclosed*: and not from any necessity of that width, merely for the sake of facility of entry: 200 feet *clear opening* being deemed a *large sufficiency* for the entry of an *artificial Harbour*, entirely raised out of the sea by the *Hand of Man*.

When the Harbour was formed, it was found that during all the time of *full Sea*, a strong current sets almost right across the Harbour's Mouth; that is, from *West* to *East*, which being a *natural cause* cannot be diverted; if, therefore, a Vessel coming from the *South*, that is, from the *Downs*, was to attempt to run into the Harbour, right across the current, it would carry her Eastward thereof, so as to miss the Entrance. It has therefore been an established *Maxim* ever since the Harbour was formed; and given out as a *direction*; for vessels to come in obliquely from the Westward, and to keep as close as properly may be to the *West Pier Head*; and this course, as marked out many years ago upon the *Plans of Direction*, will carry a vessel

right through the present intended opening, betwixt the *West Head* and the Head of the *advanced Pier*, which is full 200 feet in width; and she will always come in with the *Tide in her favour*.

In consequence of your orders, in the course of last summer, I made a considerable progress with this Report, intending to have compleated it *at leisure* in the course of this *spring*; but if by being called upon more hastily than I had expected, it comes out less finished than I could have wished, I have this only circumstance to plead my excuse.

I have the honour to be,

MY LORDS AND GENTLEMEN,

with the utmost respect,

esteem, and gratitude,

Your most obliged, and

most humble Servant,

J. SMEATON.

March 1791.

SECTION I.

Account of early Attempts, towards making an Harbour for the Downs; and of Proceedings, till an Act of Parliament had been obtained, for establishing such an Harbour at Ramsgate.

THE expediency of an *Harbour* for the reception of Ships in distress in the *Downs*, has, doubtless, been perceived as far back as the increase of our trade and shipping rendered it important; but the want of a *situation* strongly pointed out by nature, was, probably, the reason why we have not heard of any attempt towards it in the earliest ages.

In the time of King EDWARD VIth it is said there was an attempt to make an Harbour from *Sandwich* into the *Downs*; and that the evident traces of a canal, which are still subsisting in the level grounds between *Sandwich* and *Sandown Castle*, are the remains of that attempt. It is also said, that Commissioners were appointed by Queen ELIZABETH in 1574, to take a survey of *Sandwich Haven*, and give their opinion as to the making a better Harbour near *Sandown Castle*. Also, that in 1706, a *Plan, Report, and Estimate*, were delivered by persons appointed to survey and estimate the expence of a new Harbour from *Sandwich* into the *Downs*; accompanied with a certificate of the *Flag Officers*, and many commanders of the ships of her Majesty's *Royal Navy*,

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Navy, who then gave it as their opinion, that such an Harbour might be of general *advantage* to the *Public*.

It seems also, that on April 2, 1736, petitions were presented to the Honourable *House of Commons*, praying for a *New Harbour* near the *Downs*; and that a *Committee* appointed by the House heard evidence upon the matter thereof; and that in consequence, a *Plan* and *Survey* of the *Downs* and *Coasts adjoining*, were undertaken by Mr. LABELYE, afterwards *Engineer* to *Westminster Bridge*, at the expence of Sir GEORGE OXENDEN, *Bart.* and JOSIAH BURCHETT, Esq. then members for the town and port of *Sandwich*. In 1737-8, Mr. LABELYE published a copper-plate of this Survey, where he exhibits a scheme for sheltering ships from the *Downs*, by a Navigable Canal and *Bason*, in the very direction of the *Old Cut* above mentioned; and which by *Sluices* was to join the River *Stour*.

In April 1744 the *House of Commons* presented an *Address* to the KING, That he would give directions to proper and skilful persons, to view the *Haven of Sandwich*, and examine whether a better and more commodious Harbour may not be made into the *Downs*, near *Sandown Castle*, fit for the reception and security of large merchant ships, and men of war; and to survey the said ground and shore, and also the River *Stour*, which would be necessary for *cleaning* and *scouring* the said *Harbour* when made; and to make an *Estimate* of the charges and expences thereof; to be laid before *Parliament* the ensuing session.

In consequence of the above, an order was issued from the *Admiralty*, appointing the following persons to this business; W. WHORWOOD, JOHN REDMAN, JOHN MAJOR, THOMAS SLADE, CHARLES LABELYE, and R. CHARLES; who reported, that having made the neces-

fary observations, they were of opinion that " a *better* and more commodious Harbour, than the present Haven of *Sandwich*, may be made from the town of *Sandwich* into the *Downs* near *Sandown Castle*."

They proposed to carry out two *stone Piers*, each 2,096 feet in length, from the shore, into twelve feet depth of water at low water; to have a clear opening between the heads of 300 feet; to narrow from that to 100 feet; and that the middle line should point S.S.E. $\frac{1}{2}$ E. by the compass; that is, nearly S.E. by the true *Meridian*, or S.S.E. as the compass now points. The *Estimate* for this work was £.389,168. 13. 2. exclusive of the value of the grounds to be purchased.

The *Report* being referred to a *Committee* of the whole *House of Commons*; after examining evidence of pilots and persons best skilled in the navigation of the *Downs*, the *Committee* came to a resolution, dated the 26th February 1744-5, importing, that it appeared to that *Committee*, " that a safe and commodious Harbour may be made into the *Downs*, near *Sandown Castle*, fit for the reception and security of large *Merchant-men*, and ships of *War* of *Sixty* and *Seventy Guns*, and be of great use and advantage to the *Naval Power* of *Great Britain*."

WHY this great work was suspended, after being brought this length, does not now distinctly appear; but if we consider the largeness of the sum estimated, for a work supposed to be *undertaken* by *Government*, at a time when we were at *War* with *France* and *Spain*, we perhaps need not be at a loss to judge.

The whole affair seems however to have lain dormant for some time, till the Public was roused by a *violent Storm* which happened upon the 16th December 1743;

wherein a great number of vessels were driven from their *anchors* in the *Downs*; and, being forced upon the South Coast of the *Isle of Thanet*, several found safety in the *Little Harbour* of *Ramsgate*.

This seems at once to have opened the eyes of the Public, and caused them to be turned upon *Ramsgate* as the proper place for the reception of Ships, when in distress from bad weather in the *Downs*; and accordingly, the 8th February following, a petition was presented to the House of Commons, by several *Merchants* of the City of *London*, Owners and Masters of ships, whose names were thereunto subscribed, amounting to 131; which was referred to a *Committee* appointed to sit the 13th following; and on that day a petition was presented from the *Mayor*, Magistrates, Freemen, and Inhabitants of *Sandwich*, setting forth the damage that would be likely to arise to the *Haven* and Port of *Sandwich* from the extension of Piers into the Sea at *Ramsgate*; which was referred to the same *Committee*.

In support of the petition of the *Merchants*, Owners and Masters of ships, a great number of witnesses were examined, and to a considerable length: and the following points were fully and clearly proved to the satisfaction of the *Committee*:

I. That in the said *great storm* of *December* preceding, a number of ships were actually forced into, and saved in *Ramsgate Harbour*, although then so small as to be scarce capable of receiving vessels of 200 tons, at any state of tide; the pier there having been only built and maintained by the *Fishermen* of the place.

II. That the winds, whereby ships riding in the *Downs* are most apt to be annoyed, are from S.S. E. to S.S. W.

III. That at *Ramsgate*, or near it, was not only the best,

best, but in reality the *only place* where *any harbour* could be built, that could be serviceable to ships in distress in the *Downs*; because *Ramsgate* was *right in the lee* of that Road, with *such* winds as produced *that distress*: and at such a proper distance, that after driving or breaking loose, they had *time* to get *under sail*; so that with a slender share of seamanship they could *make* an harbour if built there.

IV. That though this *shore* is universally *flat*, yet as it gradually increases in depth from the *Cliffs* towards the *Downs*, it was practicable at a moderate expence, to carry out piers into $6\frac{1}{2}$ feet water, at the low water of a *middling spring tide*; and that, according to the rise of the tides, there would be water enough from $\frac{3}{4}$ flood to $\frac{1}{4}$ ebb, even at neap tides, to carry in vessels drawing 15 feet water; which if full built, was supposed to be full 300 tons burthen*.

V. That when vessels break loose from their anchors in the *Downs*, it is generally from $\frac{3}{4}$ flood to $\frac{1}{4}$ ebb†, during all which time the course of the current of the tide is to the N. and N. E. which therefore would carry them right into an harbour at *Ramsgate*; so that

* I understand it can be made appear that more than four-fifths of all the tonnage and value of shipping is carried on in vessels not exceeding 300 tons.

† This will appear clearly to be the case, when it is considered, that it is the *Goodwin Sands* that constitute the *Downs* to be a *Road for Ships*. At low water those sands may be considered as a *Pier* or *Break-water* in all the easterly winds: and even at high water it is too shallow over them, to admit the great seas to pass without being much broken and dispersed, especially in stormy weather. From the situation, therefore, of the *Downs*, with these sands on one side, and the coast of *Kent* on the other, it is only the southerly winds that can annoy them; which also are much moderated by the proximity of the coast of *France*, and still more so by the first part of the flood-tide running Southward, and meeting the seas; it is therefore not till the tide turns to the *North* (which is at or about $\frac{3}{4}$ flood) that the combined force of wind and tide make the great effort to break the ships from their moorings.

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by the time they get thither, it would be within an hour of high water.

VI. That the soil at *Ramsgate*, being a *chalk* sufficiently firm to build upon, but yet so yielding that the keels of vessels readily make a *Dock* for themselves in it; this, with sometimes a slight cover of sand, forms a proper bottom to lay full built ships aground upon at low water: and even if they are sharp built it will, in case of necessity, subject them to the least possible damage; and indeed to little or none, if proper precaution is taken, to lay them against a *pier*: nor could they suffer in the least, if a proper *Basin* was constructed to lay them afloat.

VII. That in time of war, merchant ships are built sharper than in time of peace; but that at an average, more of the *London* traders are built full than sharp.

VIII. That the great ships in the *Downs* are obliged to ride in a *bad road*, to be out of the way of the small vessels, which commonly lie in the *Small Downs*; and those small vessels being often ill furnished with anchors and cables, frequently break loose, and drive upon the large ships, which then run foul of each other; whereby sometimes a *whole Fleet* is set adrift; and in the opinion of *Captain Conway* (then an *Elder Brother* of the *Trinity House*) if an Harbour was made only for the reception of Ships of 200 tons and under, it would prevent *nine-tenths* of the damage that happens in the *Downs*; as he supposes, all ships under 200 tons, waiting for a wind to proceed westward, would take shelter therein.

IX. That ships in *Ramsgate Harbour* may sail out of it with *any* wind that would carry them *westward* out of the *Downs*, and even with a strong wind at East, or with a scant wind at S.E. b. E. they can make good their course out of *Ramsgate Harbour*, in virtue of the flood tide under their lee, and sail *Westward*, when Ships in the *Downs* cannot *purchase* their anchors.

X. That *large Craft* might be constantly kept afloat in

in *Ramsgate* Harbour, at low water, such as might be able to carry out *Pilots, Anchors, Cables*, and other assistance to *Men of War* and large ships in distress in the Downs*: and the coast is so circumstanced, that whenever they could not go from *Ramsgate*, boats may go out from *Dover* to ships in the *Downs*.

Upon this evidence, which I have extracted from the *Committee's Report*, I only beg leave to observe, that the *Tides*, the *Sands*, and the *Coasts* remaining the same, as also the *natural powers*, what was true in the year 1749 will remain true of those in the year 1791.

During the whole of this investigation, the *great project* of an Harbour at *Sandown Castle* seems to have been altogether lost sight of; and perhaps at this we may the less marvel, by casting our eye upon its position, as laid down in the map of the Downs: for vessels breaking loose from their anchors there, with the wind at any point, from S.S.E. to S.S.W. would be driven to the *leeward of the Harbour's mouth*, before they could get *under way*, so as to be under dominion of their helm; and therefore, after all, would be liable to be wrecked, or run ashore upon the south coast of the *Isle of Thanet* †.

* A great Number of such Crafts and Pilots now actually station themselves at *Ramsgate*, and are the means of saving many lives, and much property.

† While the investigation for an Harbour at *Sandown Castle* was going on before *Parliament*, in 1744, Reasons were offered *against* making an Harbour near *Sandwich*; to which at that time no regard seems to have been paid; viz. *Sandwich* having no convenient outlet for Ships bound to the *Westward*, they must remain *wind-bound* with many *fair winds*. 2dly, The inlet is inconvenient to *receive* ships bound to the *Westward*, which are detained in the Downs by contrary winds, and stormy weather: for, if any Ship's *Anchor starts*, or *Cables give way*, they must drive *past* the Harbour, before the Ship can be brought into a position to *put* for the Harbour.

Nor

Nor indeed, according to my judgment, could a more *injudicious construction* than the Piers proposed at *Sandown* be well imagined; for, the heavy seas that would fall in between the heads (that is, all those producing distress in the Downs) would be so augmented by the gradual contraction of the distance of the Piers, from 300 feet at their entry, to 100 feet near the basin, that vessels would not only be liable to be wrecked *between* the piers, but those augmented seas would infallibly destroy the *gates* of the *basin*, and probably the fixed part of the stone work also.—It hence appears most evident, that nature has not, in reality, furnished any situation for an *Harbour* for the *Downs*, *preferable* to that at *Ramsgate*; and therefore we need not wonder, that the project of such a long wished-for Harbour, was at that time urged in favour of *Ramsgate*, with a degree of *eagerness*, and even of *enthusiasm*.

The Act passed that session, setting forth in its preamble; “Whereas frequent losses of the lives and properties of his Majesty’s subjects happen in the *Downs*, for want of an *Harbour* between the *North* and *South Forelands*; the greatest part of the ships employed in the trade of the nation, being under a necessity at going out upon, as well as returning from their voyages, to pass through the *Downs*; and frequently by contrary winds, being detained there a long time, during which they (especially the outward bound ships) are exposed to violent storms and dangerous gales of wind, without having a sufficient harbour to lie in, or retreat into, or from whence they can receive any assistance: And whereas a harbour may be made at the Town of *Ramsgate*, proper and convenient for the reception of ships of and under 300 tons burthen, and from thence larger ships in distress in the Downs may be supplied with *pilots*, *anchors*, *cables*, and other assistance and necessities; and by

by the *smaller* ships taking shelter in this Harbour, the *larger* ships may take the anchorage which at present is occupied by the smaller, and by that means their anchors will be fixed in more holding ground, and the ships not be so exposed to the ocean; for carrying therefore a work of such public utility into execution, &c. be it enacted," &c.

The first meeting of the Trustees was appointed at *Guildhall, London*, the 1st Tuesday in July 1749; (that was then next following) at which a large number named in the Act appeared to qualify, to the amount of 66.

SECTION II.

Proceedings of the Trustees, from the Commencement of the Work in 1749, to the total Stoppage of the same in 1755, upon Petition to the House of Commons.

THE first act of the Trustees regarding construction was to appoint a *Committee* of their Body, to view the place at *Ramsgate* where a new Harbour was intended to be made, and report their observations and opinions to the Trustees at their next meeting; and to direct that Mr. ROBINS, and Mr. TURNER of *Gosport* should be desired to attend them as *Engineers* *.

The *Committee* accordingly met at *Ramsgate*, and at their return reported, That in consequence of objections having been made, before the Committees of the House of Commons, to *Ramsgate*, for the want of a *Backwater*, they having examined, found from information, that in the year 1715 the Pier then standing had been lengthened; and by inspection it appeared, that a *Bar* of about 40

* It may at this day seem extraordinary, why Mr. LABELYE, who appears to have made the original plan, upon which himself and associates proceeded, as mentioned (page 2.) should not have been called upon and consulted in this latter state of the business; but if it is remembered, that in the year 1748, one of the Piers of the *New Bridge of Westminster*, built under his direction, most unfortunately settled, so as to make it necessary for two of the arches to be taken down, after the Bridge had been opened to the Public, we may be the less surprized.

yards breadth and length had been cast up; its highest part in thickness being $2\frac{1}{2}$ feet; and they, considering this small quantity as the gradual effect of 34 years, thought it reasonable to expect, that when a greater depth of water is made by *two* Piers, instead of one, the filling up by *Sullage* or *Beach* would become so inconsiderable, that a *small Expence would continually prevent its increase.*

They further observed, that the sea-weed or *Sullage* that drives in, comes from the Westward; and that from the East there is a drift of large *Shingle*, which, if it should take place, would be of advantage in backing the New Piers. They also made and reported many other observations, confirming what was given in Evidence before the *House of Commons* in its favour.

They endeavoured to fix their opinions as to one *material point*, which could not be so conveniently settled in evidence before the House, and about which there was some *diversity of opinions*; and that was the position of the *Harbour's Mouth*, whether South, S. S. W. or S. W. was to be preferred. Towards the resolution of this question the *Committee* premised, "That the *Stream* of the Tide in the *Downs* sets for six hours to the *Northward*, or at least between the *North* and the *East*, and then for the next six hours the stream turns, and sets to the *Southward*, or between the *South* and the *West*. But the time of *high* and *low Water* does not correspond to the beginning and end of these streams; for it is high water about *two hours* after the stream has begun to run to the *Northward*, and it is low water *two hours* after the stream has set to the *Southward*; so that when the tide first sets to the *Northward*, more than *two-thirds of the tide has flowed*, and high water happens about *two hours* after:" and that having separately examined *eleven Captains or Masters of Ships of Ramsgate*, they all unanimously agreed,

“that the most dangerous winds in the *Downs* were from the S.S.E. to S.S.W. and that the time when ships run the greatest risk of being forced from their anchors, is when the *Northward Stream* sets in; and that nearly the same time, that is at the beginning of the Northern Stream, was likewise the period when it would be most prudent for such ships as should intend for *Ramsgate Harbour* to slip their cables, as they would have both wind and tide in their favour in *standing* for *Ramsgate*; and that on their arrival they would find it near *high water*, allowing an hour for their passage.” And the Committee unanimously agreed, that “an entrance to S.S.W. was to be *preferred*; for, if placed full South, the tide near high water would run so strong *across* it, as to render it *difficult to get in*; and if at South West, they feared there might be too great an *Indraught of Sullage*.” All the bearings then referred to were settled by the compass, which in the *Downs* had then $1\frac{1}{2}$ point West variation.

They also particularly attended to the question, whether the piers should be built with *wood* or *stone*; but agreed unanimously *stone was greatly to be preferred*, were it not for the much greater expence; especially as they had found, and brought up specimens, shewing that the *Worm bites considerably in the present pier*. On the whole they were satisfied, an Harbour at *Ramsgate* would be as *practicable, useful, and interesting*, as they had before thought; and concluded with observing, “that no *other motive* than that of *avoiding expence* should have any weight in assigning to this Harbour a form *less perfect* or *extensive* than it is by nature capable of receiving.”—It does not however appear that the *Committee*, on this occasion, were attended by Mr. ROBINS or Mr. TURNER.

The next step of the Trustees was to advertise, inviting *Engineers* to deliver plans, sealed up, to their *Secretary*,

tary, Mr. ELLIOT, for Piers of *stone* or of *wood*, with the necessary specifications, and explanations, against the 29th September following.

At this time several plans and models were offered, and the 19th October appointed, for taking the plans into consideration: and also, the Secretary was ordered to invite *Engineers*, or gentlemen acquainted with *Engineering*, to assist the Trustees upon that occasion. Accordingly, upon the 19th, several persons attended under that description, and were desired to appoint a meeting *among themselves* to consider the several Plans, and give their opinion to the Trustees.

On the 26th of October the *Engineers* delivered their Report, which was subscribed by BENJ. ROBINS, THOMAS INNES, J. LEAKE, JOHN MULLER, and JOHN TURNER. The most material things that occurred therein were:

That it is improper to lay the foundation of the Piers below low water mark, with *loose stones*, thrown in at *random*.

That if the Piers are not carried out into a greater depth of water than $6\frac{1}{2}$ feet, at low water of spring tides, it does not appear necessary to be at the expence of carrying on the foundation by *Caissons*.

That the properest method of laying the foundation of the intended Piers, in the parts covered at low water, is by making a basement of stone, somewhat higher than low water mark; after the manner proposed by Mr. TURNER.

At a subsequent meeting Mr. DESMARETZ, Mr. PRAT, and Mr. MILL, gave their opinions relative to the manner

ner and materials necessary for the building Piers of the intended Harbour.

The Trustees then ordered notice to be given of a meeting upon the 15th December, for taking into consideration *all the Plans and Proposals* that had been, or should be laid before them, and to come to a determination thereon: And that all persons having any thing further to offer, should be desired to deliver in their proposals, before that time; recommending a *full meeting of the Trustees, on this extraordinary occasion.*

At this meeting several plans and sections were examined, amongst which was a plan from Captain ROBERT BROOKE of *Margate*, and a section from Mr. DESMARETZ, *Chief Engineer* at *Portsmouth*: and at a subsequent meeting, three more plans and sections were delivered; amongst which was a plan and section by WILLIAM OCKENDEN, *Esq*; one of the Trustees: And at a Meeting after that, Ten different Plans, laid before the Board in consequence of the original advertisement, were examined; and an abstract was ordered to be made by the Secretary, and laid before the next meeting; at which, on the 12th January 1749-50, it was resolved, that the Harbour should be proceeded with according to the Plan signed by the Chairman, subject to the further alterations of the Board: That the *East Pier* should be proceeded upon with *Stone*; and the *West Pier* with *Wood*.

At a subsequent meeting it was resolved, that the *Plan* and *Section* proposed and delivered by WILLIAM OCKENDEN, *Esq*; for erecting a *Stone Pier*, be adopted as the method of building the *East Pier*; and that the *Section* and *Model* proposed and delivered for a *Wooden Pier* by Captain ROBERT BROOKE, should be the method

thod of building the West Pier to low water mark at neap tides : And that Mr. OCKENDEN and *Captain BROOKE* be applied to for their description of the proper materials for the Piers respectively proposed by them.

The 2d February 1749-50, it was resolved, that the East Pier should be carried on, by workmen appointed by the Trust, and with materials purchased for 100 *feet of pier* ; and THOMAS PRESTON was appointed *Mason or Foreman* of the *Stone work* ; who, by the Board's order, was to set out for *Maidstone, Folkestone, Dover, and Ramsgate*, and to follow the instructions given him ; and *Captains CONWAY, STEVENS, and BENNET*, were desired to assist Captain BROOKE in purchasing materials and carrying on the West Head.

Mr. PRESTON's first report of the 23d following, chiefly contained an account of the stone materials afforded, and used at the places specified, whereupon he was ordered to go to *Purbeck*, to make the proper enquiries concerning the Stone there : Mr. OCKENDEN, Sir PETER THOMPSON, Mr. FRY, *Captain BARKER, Captain HUGHES*, Mr. HYDE, Mr. NORRIS, and Mr. POLE, were appointed a *Committee* for carrying on the *East Head*, and were desired to confer with the Committee for the West Head, as often as they should find necessary. Mr. JOHN SCOTT was appointed Clerk of the Cheque.

Things being thus settled, nothing happened but what might be expected to be the result of the dispositions mentioned ; and it is worthy of notice, that a quantity of *Barrow limestone* was got, as recommended by Mr. PRESTON.

In 1751 a *Committee* being appointed by the Board

to survey the state of the works, made their report the 25th July. The most material things to be observed, were as follows :

That the Stone Pier extended 390 feet, of which 104 feet was compleatly ready for the parapet, and the rest above the reach of a *Spring Tide* ; and that while the Committee was there, the foundation was continued 83 feet further; in the whole 473 feet. They examined the work, and found it free from any kind of failure whatever.

The West Head was carried out about 460 feet from the Cliff, and 540 feet thereof was proposed to be compleated that year.

The *Committee* were attended by Mr. TURNER of Gosport, and Mr. VINCENT of Scarborough ; and recommended the use of *Ashler* instead of *Backing Stone*, since a cube foot of *Shell lime* * costs more than a cube foot of *Ashler*.

A *Locker* or *Grind* was then recommended, the *Committee* being of opinion, it would collect the sand and shingle, in the outward angle of the East Pier with the land.

By the separate report of the *Engineers*, of the same date with that of the *Committee*, it appears they were of opinion, that the part of the Stone Pier then done, was but *barely sufficient* to resist the force of the sea; therefore they recommended the future parts to be made with 40 feet base, and 30 feet at top; with an additional course of *Ashler* to the height of 18 feet above the foundation, both

* At this time *Shell Lime* was used for the *Backing* of *Ramsgate Pier*.

inside and outside ; and above that one course only. Also they advised the *Core* to be lessened ; the chalk to be well beaten, and mixed with gravel ; not with mortar, as then practised ; and all the *Ashler* to be set with *Tarras mortar*, and the backing mortar to be mixed with brick-duft or sea-coal ashes.

In surveying, they found the bottom regular ; and in the circumference of the Harbour, the depth of low-water not to exceed 5 feet 6 inches ; and that the foundation might be carried out *without Caissons*, so as to answer the design, in a manner by them described ; which was that of laying large *Portland blocks* in the ground courses, so as to reach above low-water.

The following Board agreed to the use of *Ashler* for *Backing*, for the reasons given by the *Committee* in their report. A *Locker* or *Grind* to be made as proposed.—*Captain WILLIAM READ* was appointed *Haven master*, and to hoist a *flag* when there was 10 feet water at the *Old Pier head*.

6th December 1751, a *General Meeting* was appointed, to consider of the method of founding the Piers, beyond low-water mark, when Mr. WILLIAM ETHERIDGE produced a model of a *Caisson* ; and a model of a *Tool*, with the method of working it, for making a trench, and leveling the ground *under water* for setting the *Caisson* upon.—*Captain ROBERT BROOKE* sent a model for laying the foundations of *Stone*, *without Caissons*, accompanied with a description. In consequence of which the Trustees ordered an advertisement for *Contractors* to deliver plans, proposals, and estimates, for constructing the Piers beyond low-water mark.

The 3d January 1752, Mr. JAMES MOREHOUSE presented a plan, proposals, and estimates ; which, how-

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ever, were not approved; but it was resolved, that a foundation not exceeding 200 feet, be carried on with large Blocks of Stone, agreeable to two plans given in by Mr. PRESTON the *Mason*.

24th January. It was resolved that the said 200 feet of *Stone Pier* should have its foundation laid in a *Channel* or *Trench*, dug into the chalk ten or twelve inches deep; and a motion was made, and agreed to, that a *Surveyor* should be appointed; and that a proper advertisement be considered for the purpose. And Friday the 21st of the next month was appointed for the election of one, from such persons as should offer; to inspect and direct the careful and expeditious carrying on of the building: And the *Mason's Report* was postponed till a *Surveyor* should be chosen; but *Bologne* lime, and *lime-kilns*, were ordered to be set about immediately.

21st February. Resolved that such *Surveyor* as should be chosen, should have a salary of £. 200 per annum, and reside at *Ramsgate*.

On this occasion seven persons applied, amongst whom were Mr. ETHERIDGE, and Mr. VINCENT the *Engineer* of *Scarborough Pier*, who both produced ample testimonials; but on holding up of the hands, the majority was declared for Mr. ETHERIDGE, who was strongly recommended by Mr. OCKENDEN; and the latter received, on this occasion, the Thanks of the Board for his plan, care, and attention; which he was desired to continue.

28th February. Instructions were given by the Trustees to the *Surveyor*, in substance as follows:

“ The *Surveyor* is to reside in *Ramsgate*, and not be absent without leave first obtained from the Trustees, at

one of their Meetings; and to have the inspecting and directing of all the works that have already been, or shall be hereafter carried on, under the direction of the *Trustees of Ramsgate Harbour*; and also to have the direction of all the persons employed therein at Ramsgate, except the *Clerk of the Cheque*. He is weekly to transmit to the Secretary an account of the progress of the work, and of the transactions relative thereto, that they may be laid before the Board, at their several Meetings. He is truly and faithfully to inspect the several materials which shall be delivered, and report to the Board those which are not according to agreement or contract; and frequently to examine the list of the workmen employed, and see that they perform the labour they are paid for; and as soon as he conveniently can, he is to take an account of the *abilities* of the several *Workmen* employed, and report to the Secretary whether they are deserving the wages therein charged; and no alteration of wages shall at any time be made by him, without first mentioning his intention to the Trustees, and receiving their approbation. The addition or lessening the number of workmen to be left to his discretion; but he is from time to time to acquaint the Board of his reasons for whatever alterations he shall make among them. Nor is he to make any material alteration of any kind, without previously acquainting the Secretary thereof, and taking the directions of the Trustees thereon. In general he is to inspect and direct every thing relating to the works; so that they may be carried on in the most expeditious and frugal manner."

25th March. Mr. ETHERIDGE delivered his first Report, in which he describes the state of the works at *Ramsgate* on a general view: and says, that having inspected a cargo of *backing stone*, brought from *Purbeck*, he thinks it good, and capable of making very sufficient work,

without building the wall *entirely* with *Ashler*; but for the benefit of the Undertaking, he recommends to send a proper person to *Purbeck*, at the expence of the Trust, to see that the stone be good, properly worked, and the courses shipped as wanted; which was afterwards ordered by the Board.

Here it may be necessary to observe, that Mr. ETHERIDGE appears to have been a person of a truly *mechanic genius*; and having been brought forward by the celebrated Mr. KING, *Carpenter* of the works of *Westminster Bridge*, as his *Foreman*, and after Mr. KING's death, become his successor in completing this branch of those works, it might be presumed, he was a man of much experience in the carpentry line*; but being here appointed Director of the whole work; and looking upon himself as competent to the masonry as well as carpentry branch, there very soon arose a difference of opinion betwixt the *Surveyor*, and Mr. PRESTON the *Mason*, that afterwards turned out of great detriment to these works. Mr. PRESTON, though by no means equal to Mr. ETHERIDGE in general mechanical knowledge, yet was an excellent Mason, and well informed in the nature of the materials: the making of mortar being rather a *chemical* than a *mechanical* process. Mr. PRESTON, before the appointment of Mr. ETHERIDGE, not being satisfied with the use of *shell lime* under water, which was in part used at Ramsgate Harbour, recommended to the Trustees the trial of various other limestones, viz. *Aberthaw*, *Barrow*, and that of *Boulogne*, of which cargoes had been ordered; but their merits had not then been sufficiently investigated.—Mr. ETHERIDGE unfortunately

* Mr. Etheridge afterwards designed and built the famous Wood Bridge at *Walton* upon *Thames*, the middle arch of which spanned 120 feet.

had adopted *shell lime* for *waterworks*; and accounted that of *Maidstone* and *St. Vincent's Rocks* at *Bristol Hot Wells* as preferable to those above mentioned*.

Mr. ETHERIDGE, as reported, being of an austere temper, and not readily giving up what he had once advanced, a shyness took place between these two officers; which, though it did not prevent each of them from *punctiliously* doing their duty, that is, did not prevent Mr. PRESTON from scrupulously pursuing his orders from Mr. ETHERIDGE, yet it prevented that interchange of sentiments and confidence, which is so essentially necessary among the *principal officers* of a great work or enterprize, that it may be carried on to the best advantage.

Mr. ETHERIDGE now proceeded to put in practice his proposed method of laying the foundation of the Piers, in *Cases* or *Caissons*, and shewed that method of digging a *trench under water*, and levelling it; which, being attended with certainty, and every necessary degree of dispatch, has ever since been the method put in practice here, and so continues to this day.

Every thing appeared to go successfully on during the year 1752; and the Committee of the 29th September, reported that 68 feet of *stone pier*, of the same dimensions as the East Pier, had been added to the 550 feet of *timber work* of the *West Pier*, and 138 feet of foundation carried out 5 feet high.

The 26th January 1753, produced an order of Board, that Mr. OCKENDEN, and any other Gentlemen of the Trust, be desired to go to *Ramsgate* to consult with the *Surveyor* there; and give directions for a *proper plan* to

* See the chapter on *Water Cements*, in *Smeaton's Account of Edystone Lighthouse*.

be drawn of the extent and manner in which the work should be carried on, and finished; and that the said plan should be laid before the Board for approbation.

14th May 1753.—The Board read Mr. OCKENDEN's report of his Survey made at *Ramsgate*, and considered the plan for carrying out the Work, which is dated the 21st April, and signed by him and the *Surveyor*, but came to no resolution thereon; however Mr. OCKENDEN received the Thanks of the Board for his great care and pains, in making his late survey and report.

At a general meeting 14th December 1753; for considering the *Plan of the Harbour*, a motion was made, that the Harbour be contracted to 1200 feet in width, according to the Plan this day laid before the Board by Mr. OCKENDEN; which being *debated*, was carried on a division of 28 to 15. And on an adjournment to that day se'nnight, the resolution was confirmed, 26 to 7.

Upon this contracted Plan, which appears to have originated with Mr. OCKENDEN, Mr. ETHERIDGE seems not only to have vigorously proceeded, but even to have *pushed* the Execution; for, by the Committee's Report on their visitation, the 9th October 1754, after declaring their opinion, "*that the Contraction ordered by the Board will leave the Harbour large enough to contain more ships than will ever have occasion to lie there at the same time;*" and "*that the curve at the West Pier continuing the same, as it was in the original Plan, will give sufficient room for ships to bring up:*" They reported, that at the West Pier, the 138 feet of foundation mentioned last year to be laid, was *taken up*, and a temporary *cross wall* of backing stone had been carried out Eastward 278 feet; but that from the East end of this, near 300 feet had been carried out Southerly, to 5 feet high,

high, and upwards; and 111 feet to 19 feet 8 inches; and furthermore, that the piles had been driven for founding 80 feet more.

At this Meeting the *Surveyor* pointed out a communication to be necessary by land to the *West Pier* at *high water*, and recommended a *staircase* from the top to the bottom of the Cliff; which work being soon after executed, was called *Jacob's Ladder*, and still retains that name.

This appears to be the last work of Mr. ETHERIDGE at *Ramsgate*; for while the works of this summer were going on, remonstrances to the Trustees came from several ports, declaring strongly against the *Contraction*; and which ended in an application to Parliament in 1755; when the *Petition of Merchants, Owners, and Masters of Ships*, whose names were subscribed, sets forth, "That from the works carried on under the direction of the *Trustees of Ramsgate Harbour* for some time, your Petitioners had great reason to hope, that a *safe* and *commodious* Harbour would be made there, for the reception of Ships and Vessels; and thereby the intention of the Legislature answered, in imposing the duties; but that in or about December 1753, the said Trustees resolved to alter and *contract* the said Harbour, and during the last summer, such works were carried on towards altering and contracting the same, as, if further proceeded in, and finished according to the said Resolution of the said Trustees, will, in your Petitioners apprehension, render the said Harbour in a great measure *useless*, and that the expence thereof will be lost to the Public.

"That as your petitioners are fully *convinced* a *safe*, *commodious*, and *useful* Harbour, may be made at *Ramsgate*,
to

to the great advantage of the commerce of this kingdom, under skilful and proper directions;

“ Your Petitioners therefore humbly pray this Honourable House will take into their consideration this Matter, in which the Public is so *greatly* interested, and grant such Relief therein, as to this *Honourable House* shall seem meet.”

The matter of the above Petition being fully heard by the House of Commons, in the early part of the year 1755, that House thought proper to address his *Majesty*, “ That he would be graciously pleased to appoint *proper* and *skilful* persons to make a survey of the works carrying on at *Ramsgate Harbour*, and give their opinion thereon; and what might be the most *proper plan* for finishing and completing the said Harbour; to make an *Estimate* of the expence thereof; and that his *Majesty* would be graciously pleased to cause such plan or plans, and estimate, together with an account of all the proceedings of the said persons, to be laid before the said House, in the next session of Parliament.”

In consequence, *Sir* PIERCY BRETT and *Captain* DESMARETZ were appointed to this service, who the latter end of the same year, delivered their *Plan, Report, and Estimate*; and in the session of 1756, a *Bill* was brought into *Parliament*, which was *much agitated, and canvassed*; but it did not ultimately pass into an *Act*. These proceedings, however, had the effect of putting a total *stop* to the works at *Ramsgate*.

SECTION III.

Occurrences from the Stopping of the Works in 1755, to their Re-commencement in 1761.

IT may in this place be proper to give a short account of this scheme of the *Surveyors appointed*, as nothing was in reality done upon it.

The *Report* of Sir PIERCY BRETT and Captain DESMARETZ, is addressed to the *Lords of the Admiralty*, and was printed in 1756. It almost sets out with saying, that, "according to the best of our judgment, the works already made, and every plan hitherto proposed, seem liable to very material objections:" they go on to say, "and we think it proper, that the work done upon the contracted Plan should be taken up, and the materials made use of in carrying out the *West Pier*."

It is however to be noted, that the whole of the work that had been done, exclusive of what concerned the *Contraction*, was proposed to make a part of their own scheme; being at that time no other than the straight walls or *Piers* from the shore; but they proposed, by engrafting upon them, to carry out the *Pier Heads*, further by full 400 feet to seaward, than according to any of the plans that had been before exhibited, and which they supposed would place them in eight feet water. They also proposed to make the opening of the Harbour's Mouth right towards the *Downs*; whereas, according to the advice of the *eleven Captains*, mentioned p. 11. all former plans had exhibited that opening to be at S.S.W. that is about three points more westerly than the position recommended by those

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gentlemen. The *width* of their opening, as shewn in their plan, is 275 feet; which is 75 feet *greater width* than in any of the former schemes.

They further propofed “ for the better prefervation of fuch Ships and Veffels as are *sharp built*, and liable to receive damage by lying *aground*, to have a *Bafon* at the *East Side of the Harbour*, to be *junk* 16 feet from the *low water* of a *spring tide*, and partly inclofed with a ftone wall, as defcribed in the plan, where 50 or 60 Ships of 300 tons may always lie afloat in fmooth water: And we humbly conceive,” they fay, “ that *without* fuch a *Bafon*, the Harbour will *not answer* the good *purpofes* intended by *Parliament*.”

Eftimate for finishing the Harbour,

according to the Plan	- -	£. 153,548:18:10
Add for completing the propofed		
Bafon	- - - - -	50,567:14:0

Total expence of the works propofed £. 204,116:12:10

N. B. From the above fum, the Surveyors deduct for old materials, to be drawn from the contracted walls, the fum of £. 8,210. 5s. 4d. fo that the *Total* at the *foot* of *their Eftimate* ftands £. 195,906. 7s. 6d.

Such was the plan or fcheme of Sir PIERCY BRETT and Captain DESMARETZ; upon which I fhall have an obfervation to offer prefently.

How it happened that this contracted Plan of Mr. OCKENDEN's, which was productive of fo much mifchief and delay, came to be fo ftrenuously espoufed by *him*, is not now eafy to fay; certain it is, that on a *calm Review*, it amounted to no more than to make a
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less Harbour at a greater *Expence* than a *larger* ; and that without any *apparent* inducement, unless what is alleged in the *Committee's* last Report, p. 22. is to be looked on as such, viz. " that the *Contraction* will leave the Harbour *large enough* to contain more Ships than will ever have occasion to lie there at the *same time*."—How it happened that Mr. ETHERIDGE should come into the scheme, is equally wonderful, as Mr. ETHERIDGE appears to be a very ingenious person, and which therefore can scarcely be accounted for, but from *jealousy* betwixt him and Mr. PRESTON, who it seems was *against* the *Contraction*.—Finally, how it came to be adopted by the *Trustees* at large; many of whom were able and experienced Seamen, can only be accounted for, by supposing that Mr. OCKENDEN, having had occasion to consider works of *Civil Engineering* in his private affairs, became the leader of the majority: but still, why Mr. OCKENDEN, who was a man of fortune, and then, or had been, in *Parliament*, and does not appear to have had any immediate interest in this business, should have wished, in that strenuous manner, to lead the Trustees into a scheme so unnecessary, is to me at this day equally wonderful and unaccountable: But in this I am firmly persuaded in my own mind, that had Mr. ETHERIDGE suffered Mr. PRESTON to have had his due weight, this *scheme of contraction* would never have been brought forward; which would have saved the Trustees much trouble, the Trust much expence, and the Work itself great loss of time.

In this state the Harbour was at the time of this struggle; the East Pier being carried out 757 feet from the shore, and the West 849. There, however, appears not the least apprehension from the Public that the situation of the Harbour at *Ramsgate* was *improperly chosen*; the effort was, that it should not be *contracted*, and its utility thereby diminished. Nor did any seem to wish it en-

larged, Sir P. BRETT, and Captain DESMARETZ excepted. And how must these Gentlemen have stood aghast, supposing their projected *Basin* (16 feet under low-water mark) could have been at *once executed*; if they had afterwards found, on turning the *Curves* of the *Piers*, that the first operation of nature, was to fill it up, not only level with, but much above the level of the ground wherein it was dug!

After this total stop of the Works, a considerable pause followed: for we do not find the record of any transaction till the 30th April, 1760, when the Board came to a resolution to proceed with the Works, and gave an order for stone, and other materials necessary for the purpose. It may, indeed, seem extraordinary, that in the last *four years nothing was done*; but I have been informed, that the Trustees were totally at a loss *what to do* as the Works had been entirely suspended; and no *new* act of Parliament made, to chalk out what was to be done. In this interim, I understand, the Trustees applied to the *House of Commons*, and also to the *Lords*, and were told, *verbally*, that as nothing had been done to suspend or alter their original powers, the best way would be to proceed according to their own discretion.—Accordingly, the 20th June, 1761, a *Committee*, by appointment of the Board, assembled at *Ramsgate*, and reported, that it would in the *first place* be necessary to *take up the contracting walls*, of which they ordered a beginning.

SECTION IV.

Transactions of the *Trustees*, from the Re-commencement of the Work in 1761, to the End of the Year 1773, when the *Committee* pressed the *Board* to consider of more effectual Means of cleansing the Harbour.

A *Committee*, by appointment of the *Board*, met at *Ramsgate* the 25th June 1762, and reported, That a good deal had been done in laying fresh foundations, and taking up the works of the *Contraction*. Little had been then done at the East Head; and they recommend the works to be for the present carried on at the West Head only *.

The several successive Committees of Visitation chiefly contented themselves with reporting the progress of the works. That of August the 25th 1766, particularly mentions, that the work of the fourth *Kant* or Flexure of the East Pier, towards the West, was then going on, and the second *Kant* of the West Pier was in hand. "That the *Committee* observe a *Collection of Sand* in the Harbour, increasing under the *East Head*, near the *Stairs*; and re-

* In this Report, mention is made of a contract for getting stone upon the sea-shore, under the Cliffs at *Lyme Regis* in *Dorsetshire*, for burning into lime.—For the qualities of this Lime, see *Smeaton's Account of Edystone*.

commend

commend it, as the principal work for the next year, to finish the *West Head* as soon as possible, which they *hoped* would prevent a further increase.

Till this visitation, the works of *Ramsgate Harbour* (the interruption from the contracted plan excepted) appear to have gone on with alacrity, and in full *confidence* of every degree of success that had been expected: but it was now a mortifying sight to the Trustees, to find that no sooner had they begun to bend the walls towards one another, so as to afford protection as an Harbour for shipping, than *Sand* began to collect, threatening to choak it up. This struck the Trustees with so much *chagrin*, that in the year 1767 they made no visitation; and in July 1768, after reporting the progress of the walling, they only recommended the work to be continued at the *West Head*, without noticing the state of the *Sand*,

The successive accounts from *Ramsgate* contained so little consolation, or hopes of amendment, that the years 1769 and 1770 passed without a visitation from the Trustees: but the next year the *Committee's Report*, which bears date *Ramsgate*, 25th August, 1771, after stating the progress, and that the *East Head* was founded, acquaints us, that the *Committee*, in order to fix the entrance of the Harbour, directed *three poles* with *Flags* upon them to be erected, one at 200 feet, one at 250, and the third at 300 feet from the *East Head*, which last was then found to be 25 feet distant from the work of the *West Pier*; and that the *Committee*, after taking several different views of the Harbour, and upon mature consideration, recommend, that the entrance be 300 feet; and Mr. PRESTON was then directed to prepare a proper *Finishing* for the *West Head*, agreeable to those dimensions.



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The Committee conclude their report with observing, that, though an *Hopper* and *two Lighters* had been employed since January 1770 to empty the Harbour, yet they are sorry to inform the Trustees, that the Sand had much *increased* therein; but that they had given directions to continue, with the utmost diligence, to do every thing in their power to make the Harbour useful; and recommend to the Board, to consider if they can find out a *more effectual method*.

The Committee's Report of 1772, comprehends only the report of progress; the two *Heads* being now in great forwardness.

Ramsgate, 31st August 1773, the *Committee* after reporting progress, towards finishing the Heads, and that an *Engine* had been fitted to a lighter for *taking up sand*, and another *Engine* for *throwing up* sand had been repaired; add, that they could not help expressing their great concern, in finding a *vast quantity of Sand and Sullage* lodged in the Harbour, notwithstanding since January 1770 upward of 52,000 tons had been taken out, at an expence of £. 1,100; and that it was feared it was rather *increased* than diminished: and furthermore, that the men employed herein refused to work without an *increase of price*.

The *Committee* desired to remind the *Board*, that in 1771 the *Gentlemen* expressed their apprehensions on the same account; and recommended it to the Board to consider of some *more effectual* method of clearing the Harbour.—That in consequence thereof the Secretary had directions to write to Mr. SMEATON, that the Trustees desired to have his advice upon *the clearing and deepening of the Harbour*: but as the Committee were informed that he could not attend them that year, on ac-

count of a pre-engagement of his, to go to *Ireland*, the *Committee* therefore advise nothing more to be done, till the opinion of that gentleman, or that of some other able *Engineer*, could be had. The *Committee*, however, observed, that of the sand thrown over the *East Pier*, considerable part returns with the tide, and settles in the Harbour: therefore, should the Board think it advisable to continue taking up the sand, &c. they recommend it to be taken 200 feet from the *East Head*; and 400 feet range along that side; and to be carried up in the Harbour, within the 119 feet of *cross wall now building**; and, in order to prevent its washing out again, to build another wall, joining that, right in towards the Cliff.

Subscribed by *Messrs.* BARKER, SLATER, AUBERT, HUNT, JAMES, and BENNET.

* A wall building to confine in the mud and silt that was to be discharged from the *Lighters*, and deposited behind it.

SECTION V.

Proceedings of the *Trustees* from the Beginning of the Year 1774, to the Delivery of Mr. SMEATON's *Report*; and Transactions upon it, to the End of the Year 1778.

RAMSGATE, 6th April 1774, Mr. SMEATON attended a *Committee* of nine *Trustees*, and the *Secretary*.

The Storekeeper and Harbour-master were ordered to prepare an account of all the Sand and Sullage, that had been carried out of the Harbour, for the information of Mr. SMEATON.—The *Harbour-master*, *Foreman Mason*, and *Boatmen*, to attend him in taking soundings, &c. In consequence of which he proceeded to make *experiments* upon the quantity and nature of the Silt brought in, and to *investigate* every matter that appeared to him necessary, in order to make a full report upon the subject of *cleansing* the Harbour now before him.

The *Committee* further report, that Mr. PRESTON laid before them a Plan for *cleansing* the Harbour, by *Harrowing up the Sand*, so that it may mix with the water, and be carried out with the ebb tide; and he was ordered to prepare a *Model* of the machine for that purpose, as soon as possible, and send it for the *Inspection of the Board*.

The 27th August the same year, the *Committee* again met at *Ramsgate*, and mention that a quantity of stone

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had

had been laid to *secure the outer end of the East Head*; and that 260 tons of *Portland* had been taken out of the foundation of the *Contracted Wall*.

Mr. PRESTON now produced a *Model for cleansing the Harbour*: in consequence, the *Committee* gave directions for making a number of *Rakes* for *stirring up* the sand in the Harbour; and the 29th, the *Committee* stationed 14 men with the *new rakes* at the West side of the Harbour, at two-thirds ebb, and attended their working till flood; and ordered them to continue working every tide for seven or eight days; and that *stakes* properly *marked* should be driven where they worked, and a *marked staff* be got by the *Harbour Master*, to take the depth of the sand at the centre, within and without the Harbour's mouth; to ascertain the effect of the *rakes* in reducing the Sullage of the Harbour.

24th October. Mr. SMEATON transmitted his report to the Board, in consequence of his survey of the 6th April before mentioned. An *Abstract* and *Extracts* of the most material parts thereof are as follows:

“ Having been consulted by the *Trustees* of the *Harbour of Ramsgate*, upon the *best and most effectual method of clearing the Harbour from Silt gathered therein*; having carefully viewed the said Harbour in April last, in presence of a Committee of Trustees; and having taken such soundings, admeasurements, and other observations as appeared necessary; having also considered the several *Plans* and *papers* since put into my hands, by the Board, it appears to me as follows:

“ That a large mass of *Silt*, consisting partly of mud, but chiefly of very fine sand, has been brought into the Harbour, by the tide flowing into the same. The tide water upon this part of the coast being charged with a

considerable quantity of mud and sandy matter, whenever it is agitated by the wind, accompanied with a quick flowing tide; this filty matter, being thus carried into the Harbour along with the water that contains it, and there finding a place of repose, settles to the bottom: and as there is nothing to *raise* the mud upon the *reflux*, the water quietly ebbs out of the Harbour, leaving the Silt behind. And as the *same causes* constantly operate to produce the *same effects*, a continual increase of silt must be expected to take place, till some cause is brought to operate in a *contrary* way.

“ This is the natural tendency of all Harbours; for wherever there is mud or matter to deposit, an addition to the soil is the natural consequence of a place of repose: and a deposition, and increase must take place, unless there are *powers* either *natural* or *artificial* to produce a *contrary effect*.”——“ The common natural power is a *fresh water river*; which continually tending towards the sea, and often, in time of floods, with great impetuosity, makes an effort to carry out whatever opposes it: the sand and silt, therefore, brought in by the tides, is carried out by the torrent of fresh water.—Harbours, therefore, that have no land water, or *Back Water*, cannot naturally keep open for a long course of years*.—These being the effects of the powers of Nature, we must by no means wonder, that the *Harbour of Ramsgate*, into which, and through which, not the least rivulet or runner of fresh water takes its course, has *obeyed* this general tendency. For, in proportion as the work of the Piers has advanced, the space being inclosed, and the water rendered more quiet, and in that respect more fit for the purposes of an Harbour, in much about the same proportion has the *Silting* of the Harbour taken place;

* Large *natural Harbours*, or *Arms of the Sea*, will necessarily be a long time in filling.

and must continue to encrease till the *area* of the Harbour becomes *dry land*; and instead of a *receptacle for ships*, a *field of corn*; that is, unless recourse is had to such *artificial means* as have the due efficacy.

“ How far these effects were or might have been foreseen before the Harbour was built; or being foreseen, how far it might be proper to build an Harbour there, is NOT NOW THE QUESTION*. The fact is, that a *noble piece of masonry* has been erected at a very considerable expence, inclosing a *large area*, in a *place* where it doubtless must be of very great utility as an *Harbour*, in case the ground so inclosed had remained as clear of Silt as it was before its inclosure. The *question* therefore now is, *what* in effect you put to me, *How* to make it as *useful as possible*, and at the most *moderate expence*.”

In the course of this Report, it is stated from actual computation, that at this time, there was not less than 268,700 cube yards of Silt in the Harbour: that the two barges then employed by the Trustees, with ten men each, got about 70 ton of Silt per day; and supposing them capable, from weather, regularly to work at this rate, which is scarcely possible; and that a ton of Silt will be a cube yard, of which, in reality, it is much short, yet the Harbour, at this rate, would be above 12 *years* in clearing, even supposing that no fresh Silt was to come in during the time.

It is further shewn, that the whole Harbour contains 46 acres; and that the *area* of the external Harbour where the Silt chiefly lies, being $30\frac{1}{2}$ acres, one-tenth of an inch in thickness over this whole area would amount to 410 cube yards or tons; and this, at 70 tons per day, would take a week to clear it. Now sup-

* This being wrote in 1774; the *Effect* since has determined the *utility*.
posing

posing the mud to have come in at this rate only, the present mass, independent of what had been carried out, would have taken $12\frac{1}{2}$ years to have collected: but as it has been chiefly collected since the inclosure of the Harbour, by the curves having been got above half tide*; the increase of Silt could not be reckoned at less than double that quantity, or one-fifth of an inch per week; which would afford a similar employ for *four Barges*; and therefore that this, with the clearance of the present accumulation, and that their work must in reality fall short of the calculation, would render the whole so tedious a business, that it by no means appeared to be the *cheapest*, or *most effectual* means of *clearing* the Harbour, which was the question before Mr. SMEATON. He therefore proposed "a method of procuring an ARTIFICIAL BACK-WATER by means of *Sluices*."

"Where no fresh water is to be procured, as is the case at *Ramsgate Harbour*, the only resource is to construct a *Pool* or *Bason* to take in the sea water; the tide there having a considerable rise and fall. This has been done in many cases abroad, and particularly in the *Low Countries*, and in some cases in *England*; but the method has fallen into disrepute *here*, by its having been found, that the Bason into which the tide water has been received, has *itself* silted up, and become useless in a moderate space of time.—A method however suggests itself to my mind, though I do not remember to have any where seen it put in practice, of keeping the Bason equally as clear as the Harbour intended to be cleaned thereby: and that is, by dividing the Bason into *two*, by a partition, with a sluice or sluices upon it, capable of retaining the water in either, while the other is empty; for by this means they can reciprocally be made a

* It was only at the Visitation of August 1766, that the growing of the sand was first noticed by the Trustees.

Bafon for clearing each other; and both united, for clearing the Harbour.

“ The Harbour of Ramsgate is very well adapted to the execution of this scheme. It has every where a sound bottom of chalk, upon a regular decline, from the Cliffs towards the Harbour's Mouth, and from thence out to sea. The *set* of the tide, which is pretty brisk at particular times, runs crossways upon the Harbour's Mouth, so that as soon as the sand is washed to the outside of the Heads by the artificial current, the natural current of the tides will wash it away, and *effectually prevent* any *Bar* from being formed before it.

“ The sand itself is of such a nature, as to give the least resistance possible to a smart current; for the grains themselves, though hard, and specifically heavy, yet being small, and not united by any *tough* loamy or tenacious matter, will give way to the impression of a current.”

This Report was accompanied with a *Plan*, distinctly shewing the mode of executing the Scheme; which was by carrying forward the Cross Wall, already begun for *another purpose*, in an Eastern direction to a certain Point.

A space thus marked out, was shewn to contain eight acres of water, which was proposed to be divided into two Basons of four acres each; and this, it was shewn, would produce a very powerful effect, in cleansing the Harbour, insomuch as in six months to be *likely* to make from 15 to 16 feet water, at a common neap; and from 18 to 19 feet at common spring tides.

Those Basons were designed to have four Draw Gates upon the Westernmost, and five upon the Easternmost Bason;

Bafon; the whole being pointed in *three different directions*; two towards the Curve of the *Western Pier*; four towards the *Harbour's Mouth*; and three towards the Curve of the *Eastern Pier*.

To give the Sluices all the effect possible, it was proposed to construct a *Caiffon*, shaped something like the Pier of a Bridge; which being floated to its place, and there sunk, after being put in a proper direction, might be used to divert the current to the right hand or left, as might be wanted.—This Report concludes with observing, that after the Silt is carried by the Sluices without the Harbour's Mouth, there is not any danger of its lodging there; because, having been particularly examined on the outside, and found to be all clean of Sand, there is no doubt but that the *same Cause* which now operates, to keep that ground *clean*, will continue to do it. Furthermore, that the same means that will *clear* the Harbour, will keep it clear; and that it might be expected that the playing of the Sluices eight tides at each course of spring tides, will preserve it.

This Report, which as said, was transmitted to the Board in October 1774, lay before them till August 1775, when the Committee at *Ramsgate* took into Consideration Mr. SMEATON's Plan, for making the *upper part* of the Harbour into a *Bafon* or *Bafons*, for *scouring the Harbour by means of Sluices*.—The Committee likewise conferred with Mr. PRESTON, and considered a *Plan* of his for cleansing the Harbour, by making *all* the upper part of the Harbour into a *Bafon*, for *scouring it with Sluices*; and Mr. PRESTON now declared his opinion, that it would clear away the Silt to Low Water Mark, wherever the power of the Sluices could reach*.

After

* Mr. Preston seems here to have lost sight of his scheme for *barrow-ing* up the silt, proposed to the Board in April 1774; and which was tried

After further consideration of the matter by the Committee; they being cautious in adopting a scheme of expence, gave directions (in order to try an experiment what effect an *artificial Back Water* might have) for a *Lighter* of 50 Tons to be *scuttled*, 17 inches deep, and 14 inches broad on the Starboard bow; this to be placed near the end of the Cross Wall, and filled with water. The Sluice being opened at Low Water, it run out in a few minutes, and made a cavity in the Sand of several feet in diameter and depth; but the ground here being higher before the head of the *Lighter* than at its stern, the water spread astern, without making the impressiion expected.

The *Committee* now ordered the *Lighter* to be *removed*, and placed between the Cross Wall and the Harbour's Mouth, and there repeated the experiment. The first tide the water being let out, made a greater impressiion than before, but yet spread itself without making any *Channel*.

A Channel was then ordered to be *made*, and guarded with planks, and in the afternoon (the *Lighter* remaining in the same place) the experiment was tried again; and the cavity made by discharge of the Sluice, was about seven feet wide at the surface of the Sand, and six feet deep to the bed of the chalk; and a Channel was then forced of near 100 feet long. The Committee now seeing the effect of the *confinement* of the water, and of repeated discharges, tried the experiment of the Barge twice more, when the hole was rendered ten feet wide

tried by the Committee in August following. In short, ten months after the delivery of Mr. SMEATON's *Report*, Mr. PRESTON seems to have come to a different view of this business from what he had before.

upon

upon the surface of the Sand, six feet deep to the Chalk, and three feet wide upon the bed of Chalk; the Channel being full 100 feet long; and the stream carried some clods of sand to a considerable distance.—These Experiments were tried in the presence of Messrs. BARKER, SLATER, AUBERT, LAPRIMAUDAYE, BENNET, and BENNET *Junior*, who all became fully satisfied of the effect to be expected from *Sluices* when made in *large*.

Mr. BARKER, and the two last-mentioned gentlemen, continuing at *Ramsgate* another week, in that time further consulted with Mr. PRESTON, upon the eligibility of carrying the Wall already begun, across the Harbour to the old Pier, in order to make *all* * the upper part of the Harbour into a *Basin* for *scouring it with Sluices*; and after conferring with several *experienced Seamen* of the Town, respecting the most practicable method of clearing the Harbour, Mr. PRESTON was ordered to prepare estimates of the stone and timber for the *Cross Wall* and *Sluices*, and Mr. STEAD the Carpenter to prepare an estimate of the expence of making *one Sluice*, and the *time* necessary to construct it; and to make a *Model* of one, to be sent up to Town for the Inspection of the Board.—The result was, that the *Committee* finally recommended to the Board, that Mr. PRESTON's *Plan for cleansing the Harbour by means of Sluices*, be carried into execution with all possible dispatch.

In the year 1777, Mr. PRESTON, the *Mason*, being then dead, Mr. HURST, who had been foreman under him from the beginning of the Work, appears as *Master Mason*, and Mr. HENRY CULL as his foreman. A con-

* Perhaps it may not be improper to remark that in this particle ALL consists the difference between Mr. PRESTON's Plan and Mr. SMEATON's, as given in his Report.

considerable progress with the *Cross Wall* and *Sluices*, as well as other works of the Piers, was reported on this visitation, as the produce of this year's work; as also by the *Committee* of July 1778, a still further progress in the Works of the *Cross Wall*; the *floor* of the *fifth Sluice* being laid, and the *Great Gates* and *five Sluices* framed.

The *Committee* now perceived a greater *agitation* of the Sea within the Harbour, than before the *Cross Wall* was built so far forward; and recommended a range of *Piles* and *Planking* to be erected on the *East Side* of the Harbour to *abate* that agitation; and be a means of making that part of the Harbour, which is the desirable station for the shipping, more safe and quiet. This to be done with all possible dispatch, and the *Cross Wall* to be carried out with all expedition.

SECTION VI.

The First Starting and Effects of the Sluices in 1779; with the Account of their Operation, to the End of the Year 1781.

1779.

THE Committee of the 9th of August, reporting the *range of Piles* driven, and in part planked, and the works of the Cross Wall much advanced, Mr. BARKER earnestly desired to see a *trial* of these Works, though far from finished, or the walls got up to high water; yet, the first, second, third, and fourth Sluices being fixed, he made a *strenuous effort* to get the *Great Gates hung*, and the *fifth Sluice* made capable of penning in the water, while he staid at *Ramsgate*. Messrs. AUBERT and LAPRIMAUDAYE, arriving at this time, and Mr. PARIS attending: the Gates being hung, and all the Sluices put down at high water; the *Committee* attended at *low water*, and having ordered all the men to be ready, and placing them in proper proportions at the Gates and Sluices, the men applied themselves to the *handles* to start the Sluices, when the *spindles* upon which the wheels were fixed, *broke* upon the *first attempt* of every Sluice; so that at present, there was no possibility of raising any more than the *two Sluices*, viz. those in the *Gates*, and which indeed were drawn by *tackle blocks*; but the *force and power of the stream* issuing through these *two Sluices only*, was so amazingly great, that in its immediate action, it forced up the Chalk Rock, to the depth of six and seven feet, and carried pieces of it, of three to four hundred weight, to

the distance of 60 or 70 feet; and in its course, it cleared away the silt and fullage, down to the chalk, to low water mark; the stream continuing strong 2 or 300 feet without the Harbour's Mouth.—Some defects were found in the Wall and other parts, which being remedied as well as time would permit, the water was ordered to be pent up in the Basin again, and the *tackle blocks* to be applied to the *Sluices* as well as to *those* of the *Gates*; yet though all the people were properly placed, there was no possibility of raising more than two *Sluices*, exclusive of those of the *Gates*, notwithstanding 30 or 40 men heaved at each *Sluice*. However, with a great deal of labour and difficulty, the Committee afterwards got those *Sluices* started twice again; and were happy to inform the Board, that the effects produced exceeded the general expectation; the stream of water carrying the sand a great way beyond the entrance of the Harbour, in such quantities, that the Sea, at the distance of a mile, was observed to be exceeding thick and foul. The *deep channels* through the sand in the Harbour, appeared similar to the *Beds of Rivers*, and the general voice seemed unanimous, in testifying their firm belief that the BACK WATER would effectually *cleanse the Harbour*.

To devise some proper method of starting the *Sluices*, seemed a difficulty not easy to be got over; as the people could not contrive any *purchase* adequate to the purpose. But Mr. AUBERT observing, that the *planking* of the *Sluices* was put to draw *crosswise* of the plank, which working in a rough groove of *Stone*, must necessarily cause a *great friction*, orders were immediately given for the trial of one made in a different way, and they then found it to work with sufficient ease; and the *spindles* being repaired and made of *wrought iron*, the water was again pent up, and it was discharged in the presence of the
before-

before-mentioned Gentlemen, and of Mr. SIBLEY and Mr. LUTKENS, who were then arrived; and things were now found much better adapted to do their duty; but the *Committee* observing, that the rapidity of the streams of water issuing from the Sluices, had, by its great power, forced up the Chalk Rock to a considerable depth; inso-much that the Cross Wall would be in great danger of being undermined; they gave orders to the *Mason* and *Carpenter* to construct proper *Aprons* for preventing those effects.

The *Committee* further report, that during the last winter it had been a prevailing complaint, that the Harbour had been greatly *agitated*, and at some particular times rather unsafe for Ships to lie in, which was *not the case* before building the Cross Wall, as the Sea then broke, and spent itself upon the Shore; and, as it had been observed that the Sea mostly ranges along the *Western Pier*, that the Cross Wall stopping, and repelling the swell, it returns on account of its not having any vent or outlet, and causes that great disturbance and agitation now complained of. Under those circumstances the *Committee* recommend, that about 2 or 300 feet of the Western end of the Cross Wall (or *what may be necessary*) be taken down, and from thence, that a wall be built up towards the Cliff: and furthermore, that about 80 or 100 feet of the Timber Pier be taken away, beginning about the end of the Cross Wall, the opening to extend towards *Jacob's Ladder*; and the *Committee* had great hopes that this plan would render the Harbour more safe and quiet.

The *Committee* further mention it as the general opinion, that another *Sluice* will be found necessary to scour the upper or Northern Angle of the East Pier; therefore the *Committee* recommend, that a Sluice be made,

from the Angle in the Old Pier, to be carried through the *Work Yard* to the end of the *Carpenter's Shop*.

IT MAY HERE be proper, before we go on further, to advert to the state in which the Harbour really was, previous to the *trial* of the *Sluices*: indeed it was so bad, that I do not find any *memoranda* have been preserved of its condition. I must therefore recur to the state in which I found it at the time of my *Survey* in 1774—At *that time*, in the very centre of the outward Harbour, the sand was accumulated to an elevation four feet above the level at which the thresholds of the present gates are laid; and this being then the best, that is, the deepest part of the Harbour, vessels drawing above ten feet water could hardly be said to get into it, even at spring-tides.—At low water, there was no water to be seen in the Harbour, except a small roundish area reaching a little within the Pier Heads at neap tides; and at spring-tides *none* but what was immediately between the Heads.—Under the curve of the East Pier, where were the *proper Births* for large vessels (could they have occupied them) the sand lay considerably higher, so that in the third angle, which affords naturally the *best Births*, there was no less than 13 feet in depth of Silt lying upon the chalk bottom, which would be seven feet above the level of the present threshold of the gates; and, if this was the condition of the Harbour in 1774, we may conjecture how much worse it had become in this year, 1779; when the *Sluices* were first brought into action, as has been described; notwithstanding that the *Barges* had been all the time employed in getting the sand out as fast as they could. In this *forlorn* state, the *Harbour* of *Ramsgate* had become justly *reprobated* by the *Public*, as a work not having the least appearance of *utility*, or likelihood of being *made useful*.

1780.

The Committee's Report, dated 7th August, notices that 150 feet of the *Cross Wall* had been taken down, and a considerable progress made with the returning Wall towards the Cliff; and that 100 feet of the timber Pier had been removed to procure an opening; which was then made, and passable, by a *Wood-Bridge*, with a *Stone Pier* in the middle. Aprons being also laid to all the Sluices, and examined by Mr. BARKER, the water was ordered to be shut in, and Messrs. SLATER and JAMES arriving, took their station at the Pier Head, and found that the stream ran exceedingly strong beyond the mouth of the Harbour, carrying the sand into the tide.

The fifth Sluice having not yet been put in action, it was ordered to be forthwith completed, and Mr. BARKER finding a great bank of sand extending Eastward of the fourth Sluice, directed the Harbour Master to place *two Barges to turn the current* of the water to run upon the point of the bank. The fifth Sluice being completed during Mr. BARKER's stay, he ordered it to be run without the rest, and found the effects of it to be amazingly powerful; insomuch, that in a few times running, it entirely cleared away the Sullage within a few feet of the Old Pier, and carried out of the Harbour's Mouth great quantities of sand.—Mr. BARKER being desirous to have all the Sluices completed as soon as possible; and there being the greatest reason to believe, that the *fifth*, with an addition of a *sixth* Sluice, would operate very powerfully in cleansing the *East Side* of the Harbour, which, as already noticed, is the *principal Birth* for shipping, he ordered the digging for the foundation of the *conduit* of the sixth Sluice to be begun; and before he left Ramsgate, saw a considerable length of the foundation

tion dug, and a commencement of the stone work itself. He also left directions to *run the Sluices once in 24 hours*, and ordered the chalk that had been forced up by the running of the Sluices, to be laid under the *Cross Wall*, to *secure* its foundation.

Observing now, that a prodigious quantity of Silt accumulated in the *Bason* or Upper Harbour, and that the clearing it would make it vastly more commodious for shipping*; by way of experiment, he ordered the Sluices to be put down at low water, and that one Sluice only should be opened about an hour before high water; for it was supposed, that the action of the water, issuing into the empty bason, would stir up and loosen the Silt, so as to facilitate its getting out, when the Sluices acted in the contrary direction. The experiment was twice tried, and found to have *some effect*; but the power of the water seeming to endanger the foundation of the wall, he therefore found it more adviseable to order that six or eight men should attend at the running of the Sluices, to shovel down the Silt into the current, when the water was sufficiently down to admit thereof.

1781.

Committee's Report August 6th.—The Work at the fifth and sixth Sluice being now completed, a new Channel was ordered to be dug through the Sand from the sixth Sluice, and a *couple of Barges* to be laid, so as to *direct* the water thereof through the Channel. In a few times running, it was found that the Bank was considerably decreased, and that the water of this Sluice flowed so high as to overtop the Conduit Wall: from the whole of the operation of the Sluices, there appeared the greatest reason to believe, that the fifth and sixth Sluice, and

* Necessary also for the purpose of a *Backwater*.

particularly

particularly the last, would be effectual in cleansing the *East Side* of the Harbour,

From this ERA *Ramsgate Harbour* begun to put off that *forlorn appearance* of a *Repository of Mud*, and to assume a more respectable aspect than it had for 15 years past; and the TRUSTEES seeing that they were now become competent to the cleansing of the Outward Harbour, and finding the great utility of the *Bafon*, turned their mind towards the clearing of that from the Sullage gathered therein; for which various propositions presented themselves: viz. First, the Barges to be filled at a price per Ton, as had been done in the Outward Harbour. Secondly, the Sullage to be taken up and carried out with *Carts*. Thirdly, a *premium* of three pence per load to be offered to the *Farmers*, to take it out as *Manure*. Fourthly, the Barges to be filled by the Labourers, and carried out by day-work. Fifthly, the Barges to be filled with water, and being *scuttled*, to play upon the Bank of Sullage at *Low Water*, in the manner the Experiment was conducted, p. 40, Labourers being employed to throw down the Bank of Sand, The two last of which, seemed then the most practicable schemes.

SECTION VII.

Transactions from the Proposal of a *Dock* in 1782, to and inclusive of Mr. SMEATON's Third Visit to *Ramsgate*, in the Summer of 1787; with the *Transactions* to the Death of JOHN BARKER, Esq; in the Autumn of that Year,

1782.

COMMITTEE's Report, dated *Ramsgate*, 5th August. On this visit, Mr. BARKER had the highest satisfaction in finding the great improvement that had been made in the Harbour, by means of the *Sluices*, and particularly in the *middle part*; and that in the Channel under the *East Pier*, there was full 19 feet water at a spring tide.—This improvement was greatly owing to a temporary fence having been made for turning the water of the fifth Sluice to operate along with that of the fourth; but which, having been carried in an irregular line, so that the water went over it, did not produce all the effect it might have done; and therefore, as a further expedient, he ordered the Barges and Lighters to be laid along side the fence, the more effectually to confine the waters, and *grind* a Channel.—He had also great satisfaction in finding, that by the *means proposed* last year, a great part of the *Bason* was now *cleared* of Sullage, down to the Chalk; and that from the Gates to the Crane, there was 14 feet water at spring tides, and he supposed that at least 80 sail of ships and vessels might be sheltered therein.

He

He found in the Basen a *Venetian* Vessel of 300 Tons, that had been hove down, and had her Keel repaired; and also a *Swedish* Ship of 340 Tons measure, that had been unloaded of 1700 quarters of wheat, in the Basen, and there underwent a thorough repair: and with pleasure observed, that vessels brought in from the *Goodwin Sands*, made directly for the Gates, and sailed into the Basen without difficulty. Therefore, taking all these things seriously into consideration, he found that this harbour was not only a place of shelter for Ships in *distress*, but also for the repair of their damages at sea; two more articles appeared to him necessary, and these were a *Storehouse* contiguous to the Basen, for the reception of the Goods, that were obliged occasionally to be put on shore, while the Vessels were repaired; and a *Dock* for occasionally taking in a vessel to be thus repaired. These seemed indeed matters so important, and of such immediate concern, that Mr. BARKER desired to have Mr. AUBERT's advice upon them, and that he would also bring down with him Mr. SMEATON, to be consulted with respect to the *practicability* of the *Dock*, &c.

Messrs. AUBERT and SMEATON immediately attended this summons; and all agreed that the Storehouse would be of great utility, as well as the *Dock*; but that as the *latter* was likely to be a work of *Expenditure*, it would be proper not to lay more burthen upon the Trust, in the whole, than necessary: and therefore, that it would be eligible, to let an *area* of ground for a *Storehouse*, on *lease* to private adventurers, under certain restrictions; but that with respect to the *Dock*, it would probably require that care and caution in construction, as to make it not eligible to be trusted to *private* execution.

In consequence, therefore, of the orders given to me, I proceeded to inspect the ground, with a view to the

building a *Dry Dock* for the *graving* and *repairing* of vessels, and to inform myself of every circumstance relative thereto, that could *in its nature* be then known.

On this visit, it was not with a *small degree* of satisfaction that I was eye-witness to the *very great* difference that there was in the Harbour, to what it was in the year 1774, when I was last there; and that the *hints* suggested in my Report of *that Year* being carried into execution, had been attended with every prospect of success, that could reasonably be expected.

The Gates having been shut in, and having seen the operation of the Sluices, what seemed to be now most wanting, was an *increase of power*, so as to *widen* the *Channel* under the *East Pier*; and as I observed that the bringing of the stream of the fifth sluice to act along with the sixth, was but very imperfectly executed, to prevent loss of time, I then staked out a *Curve* for the direction of a fence, or *Turn-water*; which being temporarily executed with stakes and boards, and found to answer the end, has since been more substantially done.

It was then complained, that the *Gates* were much *too narrow*; but finding them 30 feet clear width, and therefore wide enough for the largest vessels *then* expected into the *Basin*, I observed, that vessels any thing *near* that width, could never venture to run in *under sail*; nor did it appear to me that those Gates had ever been designed with that *idea*: for, I found the entering angles were very little *rounded*, and the entering walls themselves upon a *parallel*, so that the least swerving of the vessels, to the right hand or left, would make them strike the stone work, unless they were very small, so that there should be a good deal

deal of *width to spare*.—To remedy this inconvenience, I recommended the building of *Flue Walls*, to project forward 30 feet, and in that length to splay out, or widen five feet each; so that at this *new entry*, the width would be virtually 40 feet; which might be deemed sufficient for securing the entry of vessels of 30 feet. I also noticed, that if the sharp angles of the stone-work of the Sluices were also properly rounded off, they would give a more full bore of water.

The Gates themselves also, being of too *slight* a construction, were already got into such bad condition, that I was desired to make a proper design, for a new pair of Gates.

I afterwards took an opportunity of viewing the *Docks* at *Liverpool*; and early in the year 1783 delivered not only my designs for *new gates* for the *Basin*, with the *flue walls*, which were immediately ordered into execution; but for a *Graving Dock* with a *timber* bottom, like those I saw at *Liverpool*, and which indeed appeared to me absolutely necessary, in such a situation as *Ramsgate*. I knew that the natural bottom would be the same as that of the whole Harbour, which was universally a *chalk*; and therefore it might be reasonably presumed, that though such a foundation was likely to be free from *grass springs*, yet it would be subject to such *transpirations* as could not take place in *clay* or *solid stone*, and would therefore need a *wooden floor*: and as in works of this kind, it is usual to call upon the *Designer*, in case any thing in the nature of the *ground*, or *foundation*, turned out *different* from what was originally to be supposed; there could therefore be no necessity to give directions for every possible case and contingency.

1783.

Ramsgate, 4th August. Mr. BARKER found that the *storehouse* recommended had been built; and that the *sharp* corners of the Sluice Walls had been *rounded off*, in order to give more water-way.—That a new fence of piles and planks had been executed to unite the waters of the fifth and sixth Sluices.—That an hill of chalk in the Bafon had been plowed up and removed—That the *East Flue Wall* of the Gates, had been carried up to the height and dimensions specified by Mr. SMEATON's Plan; and that the *West flue Wall* was in great forwardness: And he found it to be the general opinion, that these walls would greatly *facilitate* the entrance of ships into the Bafon; and that the *Graving Dock* already resolved on by the Board, would be very serviceable in the repair of ships *damaged at sea*, and brought in for that purpose. During Mr. BARKER's long stay here at this visitation, the *new Gates* were actually hung, the water shut in, and every thing found to answer; so that, after seeing the Sluices run several times, he concluded, that they would in every respect fulfil the intended purpose. He expressed himself as particularly happy in acquainting the Board, that the vast accumulated *body of Silt*, which formerly choaked up the Bafon, was now entirely *cleared away*, and that ships from 200 to 400 tons may lie in the Bafon with the greatest ease and safety, and in a considerable number. Moreover, he says, "that in the course of last Winter and Spring, property to a very large amount had been preserved, as several large ships with valuable cargoes, were brought in and taken care of. The cargo of one large ship only being estimated at £.35,000: and that, under Providence, it has been the means of

preserving many useful lives, to their families, and the community."

1784.

Ramsgate, 26th July. From Mr. BARKER's Report upon this Visitation it appears, that a new Dock being determined upon by the Trustees, to be built according to Mr. SMEATON's *Plan*, it was immediately begun, and Mr. BARKER laid the first stone, 31st July; and the Workmen were directed to proceed with all *possible expedition* *.

On this Visitation, Mr. HARST the *Mason* was found to be in a very bad state of health, and being an *old* Servant, from the first commencement of the Work, under Mr. PRESTON, and always considered as a Man acquitting himself well of his business, Mr. BARKER recommended it to the Trustees to allow him something by way of subsistence.—Mr. CULL, therefore, his Foreman, was recommended instead of Mr. HARST, as *Master Mason*, and Mr. SPEERS to be his Foreman.

Mr. CULL, being consulted by Mr. BARKER, recommended that the thickness of the North Wall of the Dock should be increased by two feet; and to build both the walls two feet higher than they had been set out in Mr. SMEATON's *Plan*, to which there could be no objection. With respect to the *Floor*, they apprehended *no difficulty* in making it of *Stone*, like that of the *Gates*; thinking it

* Here it may be proper to observe, that had Mr. *Smeaton's Plan* been in *reality* complied with, it would probably have taken the whole of this season to have completed and laid down the *timber floor*, before a single stone could have been laid; but it was thought proper to begin the *Walls* according to Mr. *Smeaton's Lines*, *exclusive of the Floor*.

more eligible than of *Wood*, as being more *durable*, and not subject to the *Worm*.

Mr. BARKER had the great satisfaction to find that both the Outward Harbour and Basen had been greatly improved, as the Channel under the East Pier had been considerably widened and deepened : and the Sullage of the Basen being now entirely and constantly kept down, betwixt four and five feet depth of water had been gained at the upper end thereof.

During this visit at Ramsgate, an hard gale of wind, which happened at N.E. gave an opportunity to Mr. BARKER to be an eye-witness of the more quiet and preferable state that the Harbour was now in, to what it was before the Westernmost part of the Cross Wall was taken down, and the *opening* made through the *West Pier*, as has been described.—The new *Storehouse* now built by direction of the Trustees, he found to be a strong and commodious building, convenient and every way adapted for the reception of goods ; as Ships of above 300 tons may range up close under it, and unload their Cargoes with the greatest facility.

1785.

Ramsgate, 5th August. On this visit, Mr. BARKER reports that the *Dock* was in great forwardness, for the Walls were built up twelve feet high, and 3,065 feet of *pavement* had been laid at the bottom. That the Gates were made, and ready for hanging, and that the whole seemed to be an exceeding good piece of workmanship ; and that it was likely to be ready for use by February next.—He notices that the *worm* prevails much here, and eats the wood work of the Sluices ; to that degree, that he recommends every part to be of stone that can be.

He

He had the pleasure to find every thing in an improving state, and that the *encomiums*, he thought it only justice to bestow upon the Harbour last year, have been more amply confirmed by the appearances in this. He says, the *whole body* of Sullage in the Outward Harbour is certainly considerably diminished; and the Channel under the East Pier improved and widened, but still not to that extent as to satisfy his wishes, or as was expected from the united waters of the fifth and sixth Sluices; however, as the widening of this Channel is of important consideration, he therefore ordered two of the Barges to be laid in the Channel, and ten or twelve men to fill them, as had formerly been done, before the Sluices were brought to act.—It was however observed to him by the *ablest Pilots*, and *Seamen* best acquainted with the Harbour, that it would not in reality *be so well* to have the *whole Bank* of Sand taken away from the Eastern Side of the Harbour; and they put a case, that supposing the Harbour quite freed of this Bank, and a Ship coming in, in an *hard gale* of wind, *without anchors and cables*; if there was nothing to bring her up, she would be liable to be driven against the walling of the Piers, and be knocked to pieces; they therefore strongly urged the *necessity* of *having a Bank on the East Side of the Harbour*, upon which ships may bring up.

He notices that it has been (and not long since) the *reproach* of this Harbour, that it never could be made capable of receiving any thing but small vessels; but that now it is capable of sheltering almost *any Merchant Ships, East Indiamen* excepted, and as a proof of it, a ship which was said to be of 800 tons, was brought into the channel of the East Pier, last winter, and lay therein for two months; and a large *Norway Ship*, called the *Ebenezer*, with upwards of 30,000 deals on board, got upon the *Goodwin Sands*, where her masts and

rigging were destroyed, but was nevertheless got off by the *Ramsgate Boatmen*, and brought into the channel of the Outward Harbour, though so much water-logged, that she actually drew $18\frac{1}{2}$ feet water: and in a gale of wind that happened lately, about 30 sail of vessels, English and Foreigners, with valuable cargoes, the greatest part of which had lost their *Anchors and Cables* in the *Downs*, were preserved by being brought into the Harbour and Basen, where they had every necessary assistance; some of them were then unloading their cargoes in the *storehouse*, being leaky and much damaged. Indeed, it is, he says, now generally admitted, that within these *very few* years, the Harbour has been improved to a degree even beyond what its warmest friends and promoters ever expected.

1786.

Ramsgate, 5th August. "Mr. BARKER thinks it proper to acquaint the Board, that the *Dock* is *built*, and is an exceeding neat piece of *architecture*; but that the water unfortunately rises up through the *Pavement*, a great part of it having been heaved up and loosened. A *disagreeable* circumstance, equally *unforeseen*, as *unexpected*.—It is now perceived that there are *natural Springs*, which rise in the bed of the Dock: that these, with the great weight of water in the Basen, when it is shut in, united, have been so strong in their effect, as not only to break through the *Cement*, but have in many places broke the paving stones; a circumstance very *mortifying*, after so much pains have been bestowed upon it."—Mr. BARKER, in consulting with the *Master Mason*, upon the most probable means of preventing the water's rising, was informed, that 23 years ago, a new *Dock* had been built in the *King's Yard* at *Plymouth*; and when shut in, it was found that the Water rose up in the bottom, and *loosened* the *pave-*
ment

ment similarly to what has happened here; and that no other remedy could be found, but new laying the Floor with *heavy* Portland blocks, which method Mr. BARKER recommends to the Board to be taken at *Ramsgate*.—He says, “ It is proposed to take up the *present pavement*, and lay down large blocks of stone, three feet by four, and two feet six inches deep, each stone to be one ton and a half; and that the *Master Mason* is firmly of opinion, the weight of these blocks will effectually prevent the water from rising, and keep the Dock dry.”

The Stone Merchants at *Purbeck*, on being immediately wrote to by the Secretary, returned answer, that they were not able to make stones to the dimensions required, and recommended stones of smaller bulk; but as that would introduce more joints and other disadvantages, Mr. BARKER took the *Mason's* advice, in having them ordered from *Portland*.

Mr. BARKER had the highest satisfaction in informing the Board, that every year more and more demonstrates the utility of the Harbour, as is manifest from the great number of shipping that in the course of last winter took shelter in it, and from the number of lives preserved. He mentions the following facts. A large *Swedish* ship ran upon the *Goodwin* and parted. Two *Ramsgate Boats*, at the hazard of their lives, brought the Crew, consisting of the *captain* and 20 men, safe on shore from the wreck*. In December last, eleven ships, all of which had lost their *anchors* and *cables* off *Dungeness*, and several of them otherwise damaged, were brought into *Ramsgate* by *Dover Pilots*; and the day before Mr. BARKER

* It is proper in this place to remark, that the *Ramsgate Boats* lie constantly afloat, ready to put off at a minute's warning; had this not been the case in that critical moment, these unfortunate men would have perished.

left *Ramsgate* a *Hamburg* ship ran upon the *Goodwin*, and the captain and crew deserted her. But she was got off, and brought into *Ramsgate* by two boats, one of *Ramsgate* and the other of *Deal*. She came into the *Bason*, and delivered her cargo, which was a valuable one, into the Storehouse.

1787.

The *Portland Blocks* being got with readiness, the work of the floor was vigorously pushed, during the winter and spring, so that it was completed early in the summer; which being notified to the Board, orders were sent to the *Master Mason*, to put the Work to a *trial*. In consequence, Mr. CULL's letters of the 3d and 7th August, acquaint the Board, "that agreeable to their orders, he had shut in the Dock; when to his great concern and surprize, and that of every one present, by the time it was high water, the greatest part of the pavement was disjointed, and hove up; and, what was yet more astonishing, near 100 feet in length of the *North Wall* was hove up also."

Ramsgate, 22d August.—Mr. BARKER on his visitation, taking the affair of the *Dock* into serious consideration, that as the Harbour was now become very useful to commercial navigation, and as numbers of Vessels take shelter therein in winter, for the purpose of repairs, the Dock must certainly be, not only an useful, but a necessary accommodation; and that a large sum of money having been already expended thereon; he judged it proper to engage Mr. SMEATON to come down with Mr. AUBERT to examine it; and, if possible, to contrive some method to render it useful.

In consequence, Mr. AUBERT and Mr. SMEATON arriving, the Gates were ordered to be shut at low water;
and

and Messrs. BARKER, AUBERT, and SMEATON, attending the rise of the tide, Mr. SMEATON'S Report to the Board of Trustees, contains the following account. "The tide rose that day to the height of thirteen feet four inches, upon the Apron of the Gates of the Dock; but before it had risen two feet, it begun to spring through several joints of the Stone-floor, which had been laid with *solid Portland Blocks* of two feet and a half in thickness, in fashion of an *Arch*; and which, to all appearance, had originally been sufficiently well jointed; and indeed, the whole building, in *point of workmanship*, as a piece of masonry, had been done in a very *masterly* manner.

"As the height of the tide increased upon the Apron, the leakage through the joints of the floor gradually formed a great depth of water upon it; so that when it was high water upon the Apron, there was a depth of five feet three inches upon the Floor: and we observed, that while the tide was rising, the joints of the Side Wall, on the North Side next the Basin, apparently opened, so as in some places to let water through the Wall; but in far less quantity than appeared to rise through the Floor*.—Every thing being left standing, when the tide had ebbed so as to be upon a level with the water within, its depth upon the Floor was seven feet two inches.

"The cause of these derangements, was doubtless the pressure of the water *under* the bottom, endeavouring to *buoy* it upwards; and which, in the circumstance of only eight feet *difference* of pressure (the greatest in this experiment) would amount to 1000 tons upon the area of the Floor. This power acting upwards, would in-

* The Committee's Report mentions, that the joints of the pavement, or more properly the *coping* of the wall, had opened one-third of an inch, though the wall itself was 14 feet thick at its *Base*.

deed be the same, whatever material the floor was composed of: but from its construction, as an *arch* of Stone, laid *very flat*, its *lateral pressure* would, in this case, be much greater than the *absolute weight* of the Wall upon its base; and therefore no wonder that it should *shove* it outward; and that the effects thereof should be perceived, by breaking the joints of the Side Wall, as has been mentioned.

“ He thinks it necessary to state to the Trustees, that this failure has not been owing to *bad materials*, or *bad workmanship*, or by taking a method in *itself bad*; but only so, by the construction not suiting the *situation and soil*: for, had the ground whereon the Dock was founded, been a stiff or moderately compact bed of *clay*, or a *rock*, either hard or soft, that would not have suffered *springs* to percolate through its pores; the Dock built as it was, or even in its *first state*, would doubtless have succeeded. But it was the circumstance of there being *springs* issuing from the area of chalk, on which the floor was laid, that has occasioned the mischief*. And in this respect, a *wooden floor*, according to the original Plan, would have been the eligible construction; as it would have been subject to the *upright pressure only*, and not to the *greater lateral pressure* of stone arches.”

The Committee's Report states, that it was Mr. SMEDLEY's opinion, that the *whole bottom* of the Dock, as also the greatest part of the *North Wall*, are so greatly deranged and disjointed, that it will be necessary to take up all the *pavement*, and take down a great part of the *North*

* As I observed a considerable stream of water continually issuing from under the Apron, at low water, I ordered this water to be drained therefrom, by a *Chain Pump*, and found that this spring (which was *salt*) vented at the rate of 160 barrels an hour; which Vent exposed the bottom to the action of the Tides Water.

Wall; and that, to render the Dock secure and dry, the bottom must be laid upon a different principle, and with a different material; and the Walls themselves solid pieces of masonry, ten or twelve feet thicker than at present: for which he was desired to make the proper designs. Accordingly the men were immediately ordered to begin to take the Wall down.

Every thing thing else was found in a way of doing its business, and answering its end; and in attending to the effects of the Sluices, it was seen that the water ran with so great a current and body, as to make its way into the sea, apparently half a mile beyond the Mouth of the Harbour; but yet Mr. BARKER's favourite wish, of *widening* the Channel under the *East Pier* to a yet greater width, induced Messrs. BARKER and AUBERT to take the opportunity of consulting Mr. SMEATON upon that head also; and he recommended it to the Trustees to build *another Sluice* to the Eastward of the *Crane*, which by uniting its water with that of the fifth and sixth, would have an increased effect, not only in *cleansing*, but in *widening* that Channel.

Messrs. BARKER and AUBERT, attentive to every thing that may conduce to the improvement of the Harbour, made use also of this opportunity in having Mr. SMEATON's opinion upon a point so very material and critical, that *before the erection of the Sluices* it could not have even been *thought of*; namely, that though by the opening of the *West Pier*, much good had been done towards quieting the Harbour, yet, as in very hard gales of North-Easterly and Easterly winds, the Harbour is still liable to a greater agitation than could be wished, a *complete remedy* was greatly *desirable*; and finding that the *Seamen* and *Pilots* of *Ramsgate* had formed an opinion, that a Wall or Pier extended out from the East
Head,

Head, to 350 or 400 feet, in a proper direction, would greatly tend to keep out the sea, and quiet the Harbour, this proposition was laid before Mr. SMEATON, and he was strongly and clearly of opinion, that such a work would render the outward Harbour *much more quiet*, and that if ~~another~~ *Sluice* was built, it would, together with the good effects from it, *before proposed*, countervail any difference that might arise from the more *Westernly* direction of the Harbour's Mouth, to take in Silt, which might (not without reason) otherwise be apprehended.

It appeared to the Committee, that in the course of last winter, no less than 60 sail of shipping had been sheltered in the Basen *at one time*, many of them brought in without *Anchors* and *Cables*, and otherwise much damaged, and under the necessity of unloading their cargoes to be repaired: and that Mr. ROWE the *Pilot* had actually carried a ship of 500 tons directly into the Basen.

The preceding proved to be the last Report of JOHN BARKER, *Esq.* who died soon after, having with great assiduity, attention, and perseverance, presided over the execution of the *Ramsgate Works* near twenty-eight years.

SECTION VIII.

The Choice of ALEXANDER AUBERT, *Esquire*,
to be *Chairman*, in Autumn 1787; and the subse-
quent Transactions down to the present Time.

IN consequence of Mr. BARKER's *death*, which hap-
pened the 1st day of November, the Trustees were
unanimous in requesting of ALEXANDER AUBERT, *Esquire*,
to take the Chair; which he having done, the Gentlemen
observed, that from the situation of Ramsgate Harbour,
and the very great use it has already been to shipping,
there was no doubt but it might be made of the utmost
utility to commercial navigation; but that as yet there
remained a great deal to be done, and many Works to be
carried forward, to bring it to that state of usefulness and
perfection that it is capable of; and that consequently, it
being an affair of great magnitude and importance to
the public, it required the constant care and attention of
a Gentleman of abilities and respectability; therefore, the
Board in the same unanimous and earnest manner, re-
quested Mr. AUBERT to take the lead in the management
and direction of the business and affairs of the Harbour,
and every thing relative thereto; to which request Mr.
AUBERT politely assented; at the same time requesting
the Gentlemen to assist and support him in every mea-
sure tending to the benefit, and public utility of the Har-
bour.

Mr. AUBERT being elected *Chairman* of the *Trustees*
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of *Ramsgate Harbour*, a Visitation was appointed, and the Chairman to be attended by the SECRETARY and Mr. SMEATON; and they arrived at *Ramsgate*, at *Christmas* the same year.

The first object of Mr. AUBERT's attention was to render the Harbour *perfectly quiet*: the utility of it, in its present state, could not be more evidently proved than by the great number of vessels that take shelter therein*.—It proved an hard Gale of Wind at East, on *Christmas-day*, so that Mr. AUBERT was himself witness to the effects thereof, and saw that a great degree of agitation prevailed in the Outward Harbour, beyond what he had before a conception of: he therefore assembled and consulted some of the ablest and most experienced *Pilots* upon the proposition mentioned, at his last attendance at *Ramsgate*, to carry out an *advanced Pier* from the East Pier Head; and they all agreed that there was an absolute necessity for such a work being carried into execution; and that if a *pier* of 350 or 400 feet was carried out in a *proper direction*, it would not only keep out the heavy sea that now tumbles in with hard gales of wind, and make the harbour more *safe and quiet*, but that the *coming into* the harbour would in reality be *more safe and easy*. For they observed, that at and near high water time, the Tide runs *briskly* from the Westward *across the Harbour's Mouth*; which obliging the ships and vessels that intend to make the Harbour, to come down from the Westward; if a Pier was extended in a proper direction, they will then come in right along with the tide, and with more facility than at present. The only thing that appeared to them in the shape of *a doubt*, or *a difficulty*, was, whether

* They were informed that above 70 vessels had been in the Harbour at once, since they were there in August last; the greatest part driven in by distress of weather, some of which were of 350 Tons.

the Harbour could be as effectually cleansed from the Silt, that is continually brought in, as it now is*? To which Mr. SMEATON made answer, that before the establishment of the *Basin* and *Sluices*, such a work could not have been *thought* of; but there is now so great a *power* of *Back-water*, and which can be increased, as already intimated, if there is *found occasion*; that if the work proposed will not lessen the facility of entry, which in their judgment it will not, *he has not a doubt but to keep the Harbour to as great a depth, and as clear of Silt, as it now is.*

Mr. AUBERT concluded his Report to the Board with observing, " That the works of *Ramsgate Harbour* have, for a series of years, been carried on without the assistance or direction of any *Engineer*, or even a resident *Surveyor*†; a few occasional consultations excepted; and in those particular cases the plans of the *Engineer* were only *in part* adopted. It therefore seemed to him, that in works of this nature and magnitude, it was of great importance to have an able and skilful *Engineer*; who, uniting the powers of *mechanism* with a thorough knowledge of the *materials*, so as to apply them to the best advantage, might rationally be expected to be the means of saving many thousand pounds, and give durability to the works; and he is consequently desirous of being guided by some professional man in that line.

" Upon these considerations Mr. AUBERT has no doubt but the Board see the necessity of employing constantly some able *Engineer* in the design and construction of their future works; and therefore, as Mr.

* Mr. Smeaton's Sketch for an advanced Pier was then laid before them.

† Mr. *Etheridge* was the only person who had been employed in this file, except occasionally, and his service terminated with the year 1754.

SMEATON has already been employed occasionally by the Trustees, and by several of the executive Boards under Government, and is well known to stand high in professional character, Mr. AUBERT is persuaded the Board will approve of his being requested to take upon him the guidance and responsibility of the engineering part of the works. But although Mr. SMEATON may be induced to go down to *Ramsgate* periodically, and to furnish every necessary plan; as he cannot upon any consideration be *resident* upon the spot, it appears necessary, in order that he may be responsible for the perfect execution of his plans, that he should have some experienced *Resident Surveyor*, in whom he can place confidence; and such a one, in case the Board should think proper to employ him, as *their Resident Surveyor*, he is enabled to recommend, in the person of Mr. JOHN GWYN, who has been employed 27 years under Mr. SMEATON's direction, as *Deputy Surveyor*; and who, during that whole period, has given him the greatest satisfaction in the execution of several capital works *."

In consequence of these recommendations Mr. SMEATON was unanimously chosen *Engineer*, and Mr. GWYN *Resident Surveyor*.

BEING NOW entered upon my office of *Engineer* of *Ramsgate Harbour*, it may be supposed, that in carrying forward the account of the transactions thereof, I am no longer under the necessity of drawing my materials chiefly from *written Documents*, but that I may in my own person carry on the narrative; and this I am the more inclined to do, as I can state my own remarks on persons and things with greater brevity.

* Mr. Aubert specified the works executed by Mr. Gwyn, under Mr. Smeaton, viz. the *Calder Navigation*; the *Bridge of Perth*; the *Harbour of Portpatrick*; the *Pier of Aberdeen*; the *Pier and Harbour of Cromartie*; and the *Drawbridge of Hull*.

1788.

In April I attended the Chairman on his first visitation this year, accompanied by the Secretary. At this time the whole of the North Wall of the Dock was taken down, and the area cleared, and a considerable progress made with the new timber floor.—Upon this visit the Chairman fully opened and explained his intentions to us, the principal Officers and Artificers; viz. That though the re-construction of the *Dock* was with him a *great object*; as, when completed, it would be of very great utility and accommodation to those who are driven into the Harbour by stress of weather; yet he could not consider it as the *primary Object* to which we ought to bend all our powers. It appeared to him, that the rendering the Harbour a place of *quiet* and *safety* for the shipping, was to be the thing aimed at, and endeavoured to be attained, in preference of all other considerations. That therefore the works of the proposed *advanced Pier* were to be *pushed*, at the same time that those of the Dock might be carried on, whenever it could be done without retarding the primary object; and with this view he ordered an additional number of workmen.

On this occasion I took the liberty to recommend, that myself, accompanied by the two principal *Artificers*, Messrs. GWYN and CULL, should visit the Stone Quarries, of *Purbeck* and *Portland*, to see and examine their present state and produce; and also more especially to examine the *Limestone Quarries* of *Lyme* in *Dorsetshire*; as I had been informed that the true *Lyas Limestone* was to be had there; and which, if so, was likely to prove a valuable acquisition to these works*. That Journey

* I did not, at this time, imagine this Lime had ever been used in those works, as it appears to have been, p. 29; though, for want of its merits being understood, it was now grown into disuse.

having

having been made in consequence, the use of this valuable Lime has been established here ever since.

The Chairman, on examination, found that the Bason was kept clear of Silt, by the use of the *Horse Dredges* or *Drugs*; and the Channel under the East Pier improved; there being now good 18 feet water at a *middling tide*, from the Harbour's Mouth up to the stairs nearest the town; and the *Sullages* of the whole harbour visibly decreased since Christmas, by the frequent running of the sluices.

Our second visit was in June; at which time the labourers were diligently employed in getting up a large quantity of stones that had been thrown in to secure the Pier Head, as mentioned in the year 1774, which it now appeared were necessary to be removed, in order to clear the foundation for the advanced Pier. But as it seemed dubious whether they could all be got up, in 9 and 10 feet water, by the usual method of *tongs*, from the barges; this occasioned me to turn my thoughts upon a *diving machine* I had formerly made use of with success, in doing works under water to a certain depth.

I had scarcely returned from this visitation, before a requisition came to desire the expedient I had mentioned, might be got ready; and which was done with such expedition, that I set forward for *Ramsgate* the 6th July, in order to put it in use; and the 12th, I left *Ramsgate*, after a full trial of the *Diving Chest*, and with the certainty of success*.

With

* Instead of the usual form of a *Bell*, or of a conical tub of wood sunk by weights (externally applied) this, for convenience, was a square *chest* of cast iron, which being 50 Cwt. was heavy enough to sink
itself;

With this machine, which enabled the workmen to stay under water any length of time at pleasure, when the wind was moderate, that the boats could attend, in the course of that, and part of the following month, the foundation was cleared*: and the tools for levelling of the ground, the same that were originally invented and applied by the late ingenious Mr. ETHERIDGE, were now put in use, under the management of Mr. CULL, the *Master Mason*, who had formerly been employed in that part of the business; it being the Chairman's wish, as best for the work, that every thing should go on in the same method as originally practised.

Soon after our return from the June visitation, Mr. AUBERT having had the misfortune to break his leg by his horse falling, could not attend the third visitation of this season. But I went with the secretary to *Ramsgate*, and the third of September we were present at the sinking of the *first Caisson* of the *advanced Pier*; when every thing was carried on with regularity; and to our satisfaction: as much additional stone being built therein that tide, as would prevent its being afterwards moved by the sea; and the next day it was got up to its height; that is, above the low-water mark of ordinary neap tides.

The *piling* of the *Dock's Bottom* was also now confide-

itself; and, being $4\frac{1}{2}$ feet in height, $4\frac{1}{2}$ feet in length, and 3 feet wide, afforded room sufficient for two men at a time to work under-it. But it was *peculiar* to this machine, that the men therein were supplied with a constant influx of fresh air, without any attention of theirs; that necessary article being amply supplied by a *forcing Air Pump*, in a boat, upon the water's surface.

* It was computed that about 160 tons of Stones had been got up in clearing the foundation, and that about 100 tons thereof had been raised by the *Diving Machine*, many of above a ton each; but the *want* of the Machine would doubtless have been the loss of the season.

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rably advanced, and several of the *double beams* of the floor were laid, and things going on to satisfaction.

The Chairman being recovered, attended the fourth and last visitation of this year. His report thereon bears date 15th November 1788. It notices that the getting up of the stones (some of them twelve feet and an half under water) which from the circumstances, had become a work of absolute necessity, had been successfully performed; and also the sinking of the *Caissons*, of which he had the pleasure to find four in their places; and built up to their proper neap tide low water height. He also found that the fifth and sixth *Caissons*, with their materials, were all in readiness; yet, observing the effects that the sea had had in a gale of wind, the night preceding; it having torn away one of the *wooden sides* of the fourth *Caisson*, he considered that the season was far advanced, and consulting the *Engineer* and *principal Officers*, it was unanimously agreed that it would be imprudent to attempt to sink any more *Caissons* at present, but rather to proceed in *securing* what had been done, as soon as possible; and then postpone the further progress of the advanced Pier till the spring.

The floor of the dock being in a state of forwardness, above half of the ground timbers being laid; the Chairman ordered that the men should be employed in that work, as much as they could be during the *winter season*; but that the *primary object* might be kept in view, Mr. AUBERT recommended that carpenters be employed in preparing and framing *more Caissons*, and that a proportionable number of masons be getting the stone ready for the same; so that the works of the *advanced Pier* might commence again, and be carried on with vigour, as early as weather would permit, the next spring.

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The Chairman further reported to the Board as follows: "That there is always a *light* put upon the head of the *West Pier* at night, as a direction and guide for vessels and boats coming in and going out of the Harbour; and also that a *flag* is hoisted on the North West Cliff, when the water rises to *ten feet* at the gates of the basin; and continues flying (in the day time) till the ebb reduces it below that depth, as a signal for vessels in the *Downs*; but as bad weather and gales of wind naturally happen in the *night* as well as in the day; and consequently ships and vessels may meet with accidents from stress of weather, or from other incidental causes, and be desirous of running to the Harbour for shelter; such vessels perhaps, not knowing the depth of water in it, are restrained from attempting to make for the Harbour when they might do it. Mr. *Aubert* therefore thought it adviseable to call in some of the most experienced *pilots*, who unanimously agreed, that a *double light*, to be always put upon the head of the *West Pier* in the night, when there shall be ten feet water at the gates of the basin, and the additional light to be elevated about eight or ten feet above the present light, and sufficiently strong and luminous to be seen in the *Downs*, would be of great utility; as the double light would be a signal, denoting to masters of vessels when they might make for and enter the Harbour with safety."

Mr. AUBERT (whenever the tide served) directed the water to be shut in the Basin, and the sluices to be run; and had the satisfaction to observe that they continued to operate with their usual force and power; as he perceived the water with a rapid and strong current carried the Silt out a great way beyond the Transport Buoy; and that by working the *Dredges*, and running the sluices occasionally at the spring tides, the Basin is kept clear of sand. He had likewise the pleasure to inform the

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Board, "That the channel under the East Pier is considerably widened, and can receive and shelter a great number of ships of large tonnage; that the depth of water is considerably increased, and the whole Harbour is in so improving a state, that there is the highest probability in the course of a few years it will become a place of the greatest consequence to the commercial navigation of this kingdom.

"Mr. *Aubert* embraced the opportunity of again assembling and asking the *pilots* their opinion respecting the *advanced Pier*, and they professed the same belief of its beneficial consequences, in quieting the Harbour; they likewise observed, "That the *present usual* and safest track for vessels making for the Harbour, is to come from the *Westward*, and that when the advanced Pier is completed, vessels will then (*as now*) come in *right before the tide*, and in all probability with more *ease and safety*."

1789.

The Chairman's first visitation to Ramsgate this year was in March; and we arrived there the 12th. The 14th the *Sheet Piling*, inclosing the circumference of the dock floor, was closed in, all the beams having been previously laid.

With respect to the Works of the advanced Pier, the *Caissons* were in sufficient forwardness; but it was yet too early in the season to attempt any thing at that. It had been built upon and secured, so that no damage had happened to it during the Winter. The Chairman therefore contented himself with examining the state of the Works, and giving the necessary directions, that every thing might be in forwardness as soon as the season became favourable,

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The second visitation was the latter end of May. We then found the floor of the Dock laid, and the Mason-work begun: but that Mr. GWYN, the *Deputy Surveyor*, being ill of an *Abscess*, was unable to attend at the yard*.

The Works of the advanced Pier were now going on, and four Caissons had been sunk this year (making eight in the whole) and others were forwarding.—Upon this journey we visited and landed upon the *Goodwin Sands*, to have a view of them, and examine *their nature*; and found that though of the nature of a *quicksand*, clean and unconnected, yet it lay so close that it was difficult to work a pointed iron bar into it more than to the depth of six or seven feet.

On this visitation I took several levels of the relative heights of different parts of the Works compared with the bottom: also particularly examined the *Light House*, at the West Pier head, as relative to the Chairman's last proposition to the Board.

In August the Trustees assembled at Ramsgate, on a *General Annual Visitation*; and the 24th reported as follows:

“ Your Committee, proceeding in their survey, ordered the water to be shut up in the Basen, and have the pleasure to inform the Board, that by running the sluices three or four times at spring tides, and working the Horse Dredges, the Basen is kept clear of Sullage. Your Committee likewise observed that the Channel under the East Pier is considerably wider, and in its present state

* Of this he died in the course of the next month; a real loss to the public, as well as lamented by his family and friends.

capable of receiving a number of Ships of 500 tons and upwards; and it is acknowledged by all Persons acquainted with the Harbour, that it has been wonderfully improved within a few years past; as in the most useful parts of the Harbour there is an increase of between five and six feet Water; and whoever contemplates it in its present state, and peruses the evidence given at the Bar of the House of Commons, prior to the passing of the Act of Parliament*, and also the preamble to the Act, will be convinced that *Ramsgate Harbour* now exceeds the hopes ever entertained by its projectors and friends, or that the legislature had any idea of at the passing of the Act, who supposed it might be made a receptacle for Shipping of and under 300 tons; but could not imagine it ever would be capable of receiving Ships of much larger burthen. That the Harbour is of great importance to Commercial Navigation, the well-attested documents of the office sufficiently prove, viz. That the Harbour (under Providence) has already been the means of saving property to the amount of between Three and Four millions sterling, and between Eight and Nine thousand valuable Lives to their friends and society; yet notwithstanding the truth of these striking facts, the present useful state of the Harbour, through prejudice or want of proper information, not being known to the public, as it ought to be, your Committee think it necessary to recommend, that Mr. SMEATON, your *Engineer*, be desired to draw up a proper Account of the Harbour, in its present improved state, to be published at a convenient time."

As the Walls of the Dock were then up seven or eight courses high: the whole design of it was fully apparent to the Committee.

* See the abstract thereof, p. 4.

The seventh Caïsson was now sunk, while the Committee were there; and every thing being in a state of going on successfully and satisfactorily; the Committee signified their wish to see the operation of the *Diving Machine*, or *Bell* (as in conformity to custom it now had acquired that name) for it appeared to the Committee that by means hereof, it would be very practicable at any time to examine the state of the *Foundations* that had been laid a number of years; and particularly, whether the Timber Bottoms of the *Caïssons* that lay under the Piers, and immediately upon the chalk, had not greatly suffered by the *Worm*? And further, that by the same means it would be practicable to make in future any repairs to the foundations that might, on account of the above, or any other account, be found necessary.

On this occasion I had the honour to attend the Chairman down to the *Bottom of the Sea*; upon which we could stand, and work in the dry. In this situation the Chairman finding himself perfectly at his ease, and very comfortable, staid full three quarters of an hour.—We found that the ground work, that is, the bottoms of the *Caïssons*, were now so deeply buried in sand and Silt, that it would be a work of considerable labour to rid it out and clean it; and as this is doubtless the best defence against the *Worm*, he concluded it inexpedient to attempt to disturb it: having fully satisfied himself of the practicability of staying *any length of time*, and of performing *any kind of work*, that the limits thereof admitted, with a capability of being removed almost at pleasure, we gave the signal for ascending; and were received with great joy by our Friends, whom we found surrounding us in boats, and who by this time were beginning to be apprehensive that something might have happened to us.

In this visitation I took an exact plan of the West Pier
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Head, to enable me to make out, for the approbation of the Board, a design of a Lighthouse for erecting a *double* light upon that head.

The Chairman's last visitation of the year 1789, was November 7th. At this time, though the weather had lately been but indifferent, yet eight Caissons had been sunk, and fixed this year; which, with the four sunk the last year, completed *twelve in two years*, as we originally had in view. The Chairman consulting the *Engineer* and *principal Officers*, considered that those twelve Caissons would need to be secured; and that the best way to do it was to build the superstructure upon them, with all possible diligence. And furthermore, that it would be eligible, rather than completing any particular part, to go on with the whole length; which being now 120 feet, that is, nearly one third of the proposed advanced pier; if weather permitted that it could be got up to high-water mark by Christmas; this would be sufficient to demonstrate the *effect* that was likely to be produced; and would be of great service in affording an addition of shelter to the shipping the ensuing winter: in short, it would give us an *experimental proof* of the *good* or *ill* that was likely to arise from the farther prosecution of this work: and the harbour having been *sounded*, nothing *so far* appeared, but what was in favour.

It also had happened in the late autumnal winds, that the *Break-water* or *Jetty*, in the external angle of the East Pier with the land, had been washed down, and totally demolished. This was a work that had been erected several years ago (p. 16.) chiefly of old ship timber, by way of experiment, for the defence of the pier, and the establishments there; and this having, with frequent repairs, answered the end ever since, it appeared therefore very desirable and necessary to be rebuilt. This being the case, the Chairman thought it would be ultimately,
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most for the benefit of the Harbour, to rebuild it with *stone*, and in the most substantial manner; it being greatly exposed: and I was ordered to prepare a proper design, for a Stone *Break-water*, or *Bulwark*, for the approbation of the Board. Here, therefore, were two objects that wanted to be prosecuted both at once; and both with our whole force; but as the *Break-water* could not be more than *totally destroyed*, which it then was, the Chairman judged it of most importance, both in point of safety and use, to carry on the advanced pier, till it was got to its height; and which was done in the course of this year.

1790.

This year commenced with the building of the *Break-water*. In January many heavy gales at west came on, which of course detained the shipping in the *Downs*, many of them therefore sought shelter in *Ramsgate Harbour*; and found it in a degree never experienced before, so that in the course of this month there were in it, *at one time*, 160 sail; the greatest part of which lay in the *Basin*; and there was room in the Harbour for many more.—This assemblage of shipping afforded a spectacle so new, that the people all round the country came to see it.

The Chairman's first visitation this year was the beginning of March; but the getting up of the *advanced pier*, and after that of the *Break-water*, having totally occupied the masons, the *Dock* was obliged to remain as it was left the last spring. The *Break-water* was now in a state of proceeding very vigorously, but it being too early in the season for any thing to be done at the *advanced pier*, the *Chairman* could only give the necessary orders; that nothing might hinder the proceedings, when the season was more advanced.

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The beginning of April a very hard gale of wind happened at E. S. E. and the caping course of the *Break-water*, not being quite closed in, the violence of the sea washed stones of a ton and a half out of their places, though every thing that had been completely fixed, stood fast. This, however, shewed us that we had not bestowed on this work more solidity than was necessary ; as some had been apt to imagine. The violence of the sea also fell so heavy upon the advanced pier, that the extreme unfinished termination became underwashed, and caused a settlement of the exterior angle ; which immediately obliged Mr. CULL to guard it with rough stones, in the manner the original Pier Head *had been*, before the removal thereof, as mentioned p. 34. and likewise to take some of it down, in order to straighten the wall.

Thursday 27th May, the Chairman arrived at Ramsgate upon his second visitation, and then found the *Break-water* completed, the damage at the advanced Pier rectified, and two *Caissons*, viz. the 13th and 14th, ready to be put down, and which were sunk while we were there. We saw the Sluices run ; examined the Channel, and found it without any sensible alteration from the prolongation of the advanced Pier.

Thursday, the 12th August, the *general Visitation* of Trustees took place, at which time the 18th *Caisson* was sunk, the Works examined, the Sluices run, and every thing found satisfactory.

Six *Caissons* having been laid this Year, and finding ourselves too late in the last season, by laying eight, it was thought best by the *Committee*, to terminate the work of this season, as to the laying down of *Caissons* ; and to employ the remainder of it, in getting the Pier built up,

so that every part might be seasoned, before the winter and heavy gales come on: and as there would now be full 180 feet of the *advanced Pier* laid; this, when raised to its height, would be a full trial of the utility, effect, and validity of this Work.

The Committee had the satisfaction to observe a very visible Improvement in the width of the Channel under the East Pier; which had been chiefly brought about by the running of the Sluices, during the croud of Vessels in the Harbour in January last.

Upon the *Chairman's* fourth Visitation of this Year, we arrived at *Ramsgate* the 21st of October, and then found the present stretch of advanced Pier, in general up to high water mark.—During our stay here, we had an hard gale of wind *at East*, for three Days together, and then had the great satisfaction to find the Harbour, which when the wind was at that point, used to be *much agitated*, was now most remarkably *still and quiet*. So great a change in this respect could have scarcely been expected, till the Pier was carried out to its full length, of which, what was now done, was somewhat more than half. On this occasion we thought it necessary to compare the *Harbour-Master's Soundings*, taken in May last, and also the present Month, with *our own* now taken, in his presence; and on comparing them, we had the satisfaction to find the Channel of the Harbour, notwithstanding the advancement of the Pier, to be in an improving state, in depth as well as in width.

The present State of Ramsgate Harbour.

THE operation of the Sluices, as has been described, has gradually cleared out a broad space, or channel through the middle of the Outward Harbour, from the Gates to the Pier Heads; and the bottom lying upon a gentle slope, there is above six feet more water in that material part, now, than in the year 1774; so that vessels drawing from 10 to 11 feet water, can go into the Bason in *neap tides*, and in *spring tides* those drawing from 14 to 15 feet.

Under the *Curve* of the East Pier, the Sluices have now cleared a *Channel* capable of taking two ships abreast, with clearance for passage, where, at *neap tides*, there is from 15 to 16 feet water*, and at *spring tides*, from about 20 feet, and often 22; so that not only Vessels of 300 Tons, the *primary object* of this Harbour, may come into it in *all Tides*, but at *spring tides* larger ships than are generally employed in the Merchants Service.—It is here in reality no *material objection*, that a vessel cannot come in from the *Downs* at *low water*; because she is not in distress *there*, till the tide is risen to that point of height, when it begins to run *Northward*; and *then*, it has been shewn, that there is always water to go into *Ramsgate*: and that, with every wind whereby she can be *annoyed* in the *Downs*, she will run right before it into *Ramsgate*; and every wind that will be *fair* for ships to proceed upon their voyages, from the *Downs*, will be also *fair* for their sailing from *Ramsgate*.

* 29th April, 1791—18 feet water in the curve of the East Pier.

If, therefore, it is *really eligible* to have an Harbour for the reception of Ships in distress, from the *Downs*, it must be somewhere upon the *flat shore* of the *Isle of Thanet*; and no place has yet been pointed out, *so proper* as *Ramsgate*.

It probably will be thought by many who cursorily view the place, and are not fully apprized of the requisites of an *artificial Harbour*, to be a defect, that this Harbour is not *entirely covered with water*, all over its area, at low water; but the *Bank* is really of the greatest utility, as will appear when the *Pilot's representation*, p. 57, is fully considered. However, notwithstanding that for the reasons already mentioned, none of the Sluices have been brought to play upon the *Bank*, yet it has in reality so much wasted, that the highest part of what now remains, is *lower* by *five* feet than the *middle* of the Harbour was in 1774: and indeed it is so far wasted and wasting, that probably it will not be many years, before expedients will be found necessary to *preserve* it. There have already been complaints, that it is grown so low, that at *neap tides* the vessels (on account of its being overflowed) cannot get their ballast therefrom; and the expedient of filling *Barges in readiness*, has lately been ordered by the Trustees, for a remedy of that defect. At a spring tide, there is now 13 feet water *over* it, so that a number of the smaller vessels may occasionally lie upon it.

Besides the completion of *the advanced Pier*, and works now in hand, there is obviously a number of articles of considerable expence, that would greatly tend to improve, strengthen, and confirm the whole Work, and which may very well be *expected* must be the case, when the various councils, turns of fortune, and changes this Work has undergone, from its commencement to the pre-

sent time, are considered: and, after all, an Harbour, that must subsist by the *artificial power of Sluices*, must be subject to a *continual expence*, and will require great care, to keep every thing in repair and in order; but if every thing is duly, properly, and attentively performed, I doubt not but to see the time when it will be said, notwithstanding its *misfortunes*, and the *obloquy* that has been occasionally cast upon it, to be a work worthy of the expence it has incurred. I will conclude with saying, that according to my information, 130 sail of ships and vessels were *at one time* in the Harbour in January 1791; driven in by stress of weather: amongst which were four *West Indiamen* richly laden, from 350 to 500 Tons: and if we are to suppose, that the whole, or the greatest part of these 130 ships and vessels would have been riding in the *Downs*, during this stormy weather, we need not be at a loss to judge what a number of additional dangers and difficulties must have been in the way of those which actually did ride there. I understand, the number of vessels in the *Downs at one time*, has rarely ever exceeded 300 sail, but in the bad weather in the beginning of the year 1790, and the present year, the *Downs* were in a great degree cleared, there being in reality *few ships* left riding in them.



A LIST of the NUMBER of SHIPS and VESSELS
that have taken Shelter in *Ramsgate* Harbour in
stormy Weather.

In 1780	—	—	29
1781	—	—	56
1782	—	—	140
1783	—	—	149
1784	—	—	159
1785	—	—	213
1786	—	—	238
1787	—	—	247
1788	—	—	172
1789	—	—	320
1790	—	—	387

Among the above were several from 300 to 500 tons burthen and upwards.

Within the last seventeen months *upwards of Six Hundred sail of ships and vessels* have taken shelter in the Harbour, of which *above Three Hundred* were bound to and from the port of *London*.

Evidence can be produced, that the Harbour has been this Winter the means of saving a great many ships and vessels: and property to the amount of between two and three hundred thousand pounds, with a great number of valuable lives, which otherwise would have been driven upon the flats and rocks, and in all probability lost.

AS an addition to this *Second Edition* of my Report, I have the pleasure of informing the public, that on the 17th July, 1791, at a high spring tide, the *New Dry Dock*, built in the Bason, for repairing ships, was tried in the presence of the Chairman, for the first time since it was found necessary to build it with a *timber floor*, which is of a new and peculiar construction, on account of the springs rising from the chalk, so powerfully under it, that the stone floor with which it had been twice tried formerly, was forced up *. The experiment answered in the completest manner; the Dock remaining perfectly dry till low water, when the sluices of the Bason were opened for scouring the Harbour: so that this very desirable object, that has been so much despaired of, is now fully obtained, and must prove of great utility to the public.

* See the note, p. 62.



F I N I S.

